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HUD-R09-EIS-78-2D

DRAFT ENVIRONMENTAL IMPACT STATEMENT

YERBA BUENA CENTER

REDEVELOPMENT AREA

CALIF. R-59

IN

SAN FRANCISCO, CALIFORNIA

Prepared by:

San Francisco Area Office
U. S. Department of Housing
and Urban Development
Environmental Staff
One Embarcadero Center
Suite 1600
San Francisco, CA 94111

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
SAN FRANCISCO AREA OFFICE
ONE EMBARCADERO CENTER, SUITE 1600
SAN FRANCISCO, CALIFORNIA 94111

REGION IX
450 Golden Gate Avenue
P.O. Box 36003
San Francisco, California 94102
Office of the Area Director

FEB 24 1978

IN REPLY REFER TO:
9.1SE

TO : INDIVIDUALS AND AGENCIES

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
YERBA BUENA CENTER
REDEVELOPMENT AREA
CALIF. R-59
SAN FRANCISCO, CALIFORNIA

Attached is the Draft Environmental Impact Statement for the Yerba Buena Center Redevelopment Area, Calif. R-59 in San Francisco, California, for your review and comment in accordance with Section 102(2)(C) of Public Law 91-190 (U.S.C. Section 4332) and implementing Federal regulations.

We invite you to submit comments on the attached Draft Environmental Impact Statement. Your responses and comments will be considered in the preparation of the Final Environmental Impact Statement. Submission of your comments within forty-five (45) days from the date of this letter will be necessary so that the Final Statement can fully reflect your views.

Copies of this Draft Environmental Impact Statement are available for reading by the public at the information centers of the HUD San Francisco Area Office at One Embarcadero Center, San Francisco, the HUD Regional Office at 450 Golden Gate Avenue, San Francisco, and the San Francisco Public Library, Government Documents Section, Civic Center.

Your comments on this Draft Environmental Impact Statement should be addressed directly to:

Mr. George B. Adams
Environmental Staff, 9.1SE
U. S. Department of Housing and
Urban Development
One Embarcadero Center, Suite 1600
San Francisco, California 94111
(415) 556-6642)

Sincerely,

James H. Price

James H. Price
Area Director

Enclosure

SUMMARY SHEET

STATUS: (X) Draft ( ) Final

SUBJECT: Yerba Buena Center Redevelopment Area, Calif. R-59 in San Francisco, California

NAME OF RESPONSIBLE FEDERAL AGENCY:

U. S. Department of Housing and Urban Development
San Francisco Area Office
One Embarcadero Center, Suite 1600
San Francisco, California 94111

1. NAME OF ACTION: (X) Administrative ( ) Legislative

2. BRIEF DESCRIPTION OF ACTION:

   HUD consideration of proposed amendments to the Yerba Buena Center Urban Renewal Plan, including designated and permitted uses for an underground convention center/exhibit hall, commercial recreation/entertainment complex, an apparel mart, high-rise office buildings and housing (market-rate and subsidized elderly units) developments.

3. SUMMARY OF ENVIRONMENTAL IMPACTS AND ADVERSE ENVIRONMENTAL EFFECTS:

   Project impacts local air pollution, air traffic congestion and municipal financing for construction and operation of the convention center/exhibition hall.

   Beneficial impacts include (designated and permitted uses) local economic stimulation and social activities in development of convention center/exhibition hall, entertainment/recreation facilities, apparel mart, high rise office structures, housing for elderly and adult family living and preservation of historic properties.

4. ALTERNATIVES CONSIDERED:

   No project. Disapproval of proposed plan changes. New town concept. Park development, Selling land to bidders.

5. ALL FEDERAL, STATE AND LOCAL AGENCIES FROM WHICH COMMENTS HAVE BEEN REQUESTED:

   See Appendix A.

6. DATES STATEMENTS MADE AVAILABLE TO CEQ AND PUBLIC:

   DRAFT:

TABLE OF CONTENTS

PREFACE

In order to facilitate the reading of this document, footnotes have been placed at the end of each part or technical section rather than at the bottom of the pages.

Clarification of the descriptions of particular locations within the Yerba Buena Center Redevelopment Area has been achieved by giving the blocks locator names, i.e., Southern Block-3 (SB-3), Central Block-2 (CB-2), etc. These are shown (together with the official Assessor's Block designation) on Figure III-4, page III-7.

For purposes of comparative analyses made in this report, it was assumed that Yerba Buena Center would be fully completed by 1988. Actual fulfillment of this assumption would be dependent on many factors the probability of which are beyond the scope of this report.

For ease of comparison with the city's separate Environmental Impact Report (EIR), similar titles have been given wherever possible to each of the areas of environmental concern, e.g., Climate and Air Quality, Community Services, Resource Use, etc. In addition, the sequence of assessments under Part VII, Probable Environmental Impacts follows that of the EIR.

In each assessment the maximum intensity of development has been assumed for purposes of evaluating the "worst case" impact. It is anticipated that some of the buildings - office, retail, residential, etc. - may not be constructed to the maximum height and bulk allowed under the redevelopment plan. For purposes of this EIS, however, it has been assumed that all buildings will be developed to the maximum allowed.

INTRODUCTION

The Yerba Buena Center Redevelopment Project was begun by the San Francisco Redevelopment Agency and the City and County of San Francisco nearly fifteen years ago. It was intended to eliminate substandard buildings and blighted surroundings and to provide land for re-use for activities appropriate to this downtown location. The Project is now well into execution; most of the land scheduled for clearance has been cleared and some of the proposed re-uses have already been built. The Agency currently holds a substantial amount of vacant land waiting for redevelopment into new uses.

A redevelopment project plan for the area was the subject of an Environmental Impact Report (EIR) issued by the City and County of San Francisco in May 1973, and of an addendum published in July 1973, under the provisions of the California Environmental Quality Act (CEQA).

The San Francisco Area Office of the Department of Housing and Urban Development (HUD) under the provisions of the National Environmental Policy Act (NEPA), issued a Final Environmental Impact Statement (EIS) on the City's proposal in October 1974.

On November 2, 1976, the voters of the City and County of San Francisco approved, by a vote of 119,611 to 85,081 (58 percent), a declaration of policy that "the City construct a convention exhibit hall at Yerba Buena Center using a four-percent hotel-room tax to finance lease revenue bonds." The policy further declared that the exhibit hall be "underground if financially feasible" and "otherwise above-ground." Responsibility for implementation of the policy was placed by the Mayor on the Chief Administrative Officer (CAO). A Convention Center Coordinator was appointed by the CAO on April 1, 1977, and on May 2, 1977, the architectural firm of Hellmuth, Obata, and Kassabaum was selected to design the new convention center to be located on a vacant one-block site bounded by Howard, Third, Folsom, and Fourth Streets.

Because the major design, configuration, and method of financing of the projected Convention Center are different from those described in the 1973 EIR and the 1974 EIS, and because many of the other proposed features and uses in the Yerba Buena Center redevelopment area are being reconsidered and may be changed, the City and County of San Francisco determined that a new EIR was needed for the Convention Center and the redevelopment area in order to assure compliance with the CEQA and its current requirements.

The 1973 EIR was written in terms of a three-dimensional design plan for the 25-acre, central blocks portion of Yerba Buena Center which was specific regarding concepts, uses, and design details in the central area which extends from Market Street to Folsom Street. Because of

delays in implementation of the redevelopment plan, including changes caused by litigation and resultant settlement agreements, some uses have been changed, some development agreements have been rescinded, and new concepts and uses are under consideration for various parts of the redevelopment area. In 1976, the Mayor's Select Committee[1] on Yerba Buena Center submitted further recommendations for changes in the earlier plan, which are under consideration.

The same anticipated and potential changes to the urban renewal plan which triggered the decision to undertake a new EIR raised the possibility that a new EIS might be needed. Since the extent and nature of these changes were not known in May 1977, the requirement of an EIS remained only a possibility. However, in order to eliminate duplication of data gathering and in the hope of expediting the process of environmental clearance in the event it was determined that an EIS was required, HUD was invited to participate in the development of the City's EIR as well as the subsequent activities which led to the selection of Environmental Science Associates as EIR consultant to the City of San Francisco.

The Yerba Buena Center EIR

The new Environmental Impact Report prepared by the City and County of San Francisco is not based upon a single project plan (or redevelopment plan) for Yerba Buena Center. The redevelopment plan for the central blocks which was described and analyzed in the 1973 EIR and 1974 EIS is no longer feasible. Four alternative plans for the 87-acre Yerba Buena Center redevelopment area are considered and comparatively analyzed and evaluated in the City's new EIR in as close to equal detail as appropriate to assist in the final decision-making process. Each alternative is based on a different plan or concept and represents a a different objective. Within each alternative, as described, there are variations to certain components which are distinguished in the analyses which follow. None of the alternatives are singled out as "the project."

The Yerba Buena Center EIS

The guidelines for the preparation of an Environmental Impact Statement under the requirements of NEPA and the administrative regulations of HUD involve the assessment and analysis of the impact of a specific "project" or "proposal," together with the development of a series of required and suggested mitigating activities to ameliorate the anticipated impacts. There is no provision for the "comparable consideration and analysis" of several alternatives without the specific project as the proposal under prime consideration. The Federal EIS process does include the analysis of all alternatives to the specific "project" or "proposal."

Following the completion of the Administrative Draft of the City's EIR HUD received a letter from the Urban Renewal Agency of the City and County of San Francisco (containing a series of potential changes to the existing Urban Renewal Plan) which asked if HUD could approve these changes should they be adopted. HUD replied that it would undertake the preparation of an Environmental Impact Statement in order to determine the environmental consequences of the proposals prior to its decision on the proposals. This decision to undertake the preparation of an EIS was made with the understanding that should the Urban Renewal Agency adopt changes to the Urban Renewal Plan which differed substantially from those being studied in this document, the preparation of another EIS or supplement covering the differences may have to be undertaken.

Source Documentation

The reports, research materials and administrative records of the 1974 EIS (updated wherever necessary) are included in portions of the current study. In addition, the basic data gathered by Environmental Science Associates and their subcontractors in the preparation of the City's EIR have been made available to HUD. HUD has been an active participant throughout the course of the EIR study and undertook in-depth reviews of preliminary drafts of many EIR components.

It will be obvious that certain data, language and analysis in this EIS is identical or similar to that contained in the City's EIR. HUD, upon independent consideration finds such material to be acceptable and consistent. HUD's general and technical involvement with the City's environmental consultant in elements of research design, data development, assessment review and analysis, as well as being a key participant on the Environmental Analysis Team[2], has resulted in a valuable common data base upon which to draw in making the independent analysis required by Federal law. In these cases, both the EIR and EIS utilize the material as their own. HUD has determined by further independent analysis, that such material is acceptable for the EIS in both scope and content. In many other instances, the independent investigative procedures and analyses by the HUD Environmental Staff has produced a fully independent assessment from that included in the EIR.

1. A citizen group composed of varied geographic, citizen and professional interests.

2. The Environmental Analysis Team was composed of the San Francisco Environmental Review Officer, the Deputy Executive Director of the Redevelopment Agency, the Project Coordinator of the Yerba Buena Convention Center, and the Environmental Specialist of the San Francisco Area Office of the Department of Housing and Urban Development.

Part III GENERAL AREA DESCRIPTION

Regional and Local Context

The Yerba Buena Center Redevelopment area encompasses 87.3 acres of land situated to the southeast of San Francisco's financial and downtown retail districts in the area known locally as the "South of Market." (See Figures III-1, 2 and 3). As used throughout this text, "South of Market" refers to a 70-block area generally bounded by Market Street, The Embarcadero, Eleventh Street and China Basin Creek, Townsend and Division Streets (Census Tracts 176, 178, 179 and 180). It is different from other parts of San Francisco in several respects. Its street pattern is skewed approximately 45 degrees from the typical north-south and east-west orientation of most of the San Francisco grids.[1] It is generally flat; only the cut-down remnants of Rincon Hill,[2] centered in the area between First and Second Streets, provide topographic variety. Its block lengths are the longest in the City, measuring 825 feet on the east-west streets and 550 feet on the north-south streets. When originally laid out in 1849, the parcels were twice the size of those in the blocks north of Market Street. Subsequent subdividing of the large, 11-acre blocks resulted in alleys 40 feet wide or narrower and lots measuring as little as 25 by 70 feet.

The South of Market district serves as the entrance to downtown San Francisco for persons coming from the east or south. It is the anchorage of the San Francisco-Oakland Bay Bridge and contains its connecting freeway linkages. It is the terminus of the Southern Pacific Railroad and its commuter lines serving the San Mateo Peninsula. It was once an important segment of the San Francisco waterfront and the site of many port-related industries, but this aspect has diminished in recent years. It still contains many industries and multi-storied warehouses, however. By their physical dominance, these uses and structures characterize the South of Market district as an important warehousing and distribution center in the Bay Area. The District also contains a residential area, located west of Yerba Buena Center, where hotels, flats, and apartments are located on the interior streets and alleyways and to a lesser extent on the principal streets.[3] The South of Market district also houses some uses which are ancillary to the Financial and Retail districts north of Market Street.

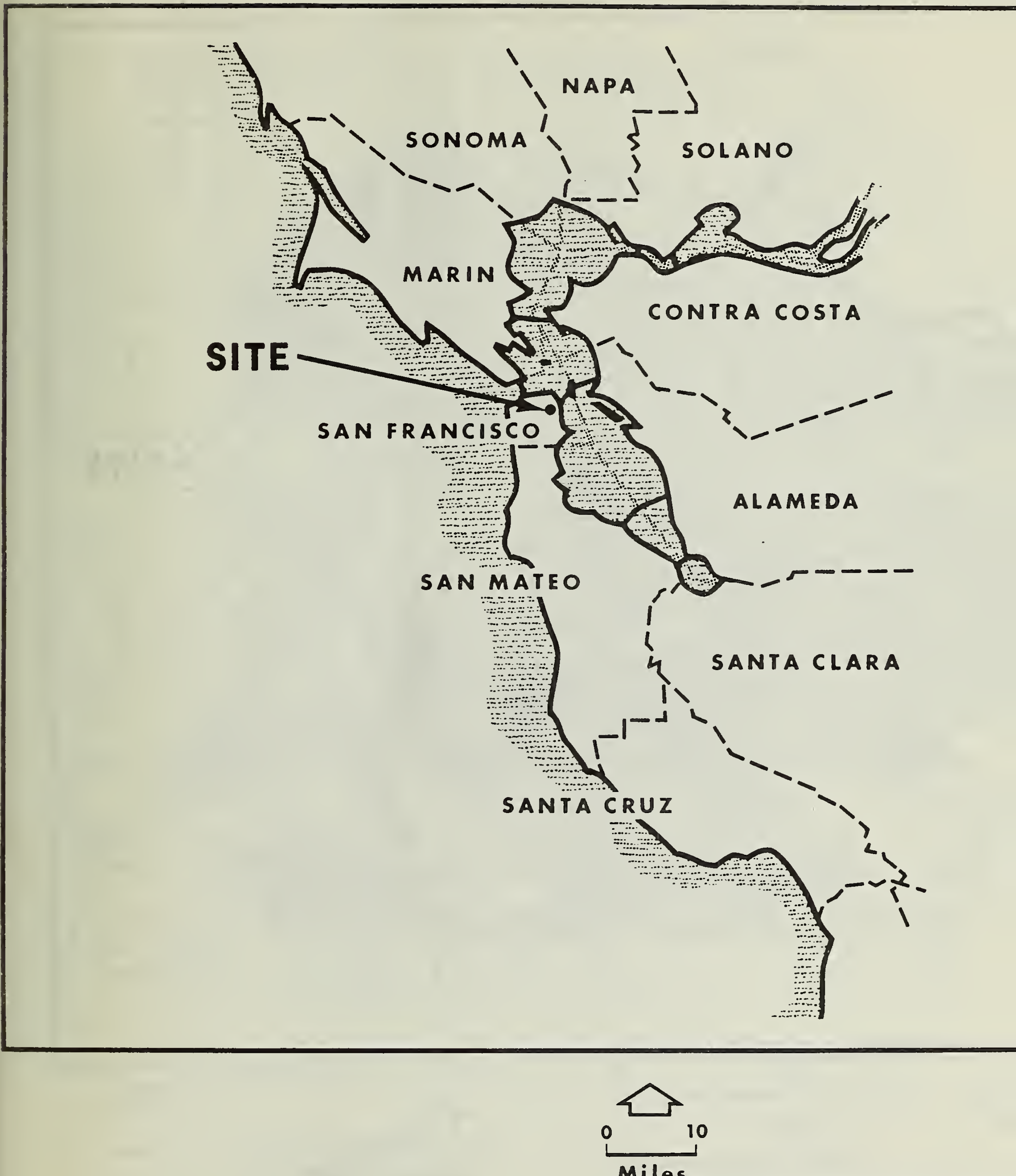
Yerba Buena Center Redevelopment Area and Vicinity

The Yerba Buena Center site has been cleared of all buildings slated for demolition except for the Imperial Hotel and an adjacent three-story building on Fourth Street, two office buildings at the northeast and southeast corners of Mission and Third Streets, the Jessie Hotel on Jessie Street and two adjacent buildings on Third Street, and the Planters Hotel at Second and Folsom Streets. The Salvation Army building is under consideration for retention. The clearance is most evident in Central Blocks 2 and 3 (See Figure III-4) which comprise 21 acres of open space. In the peripheral blocks new buildings have been built in

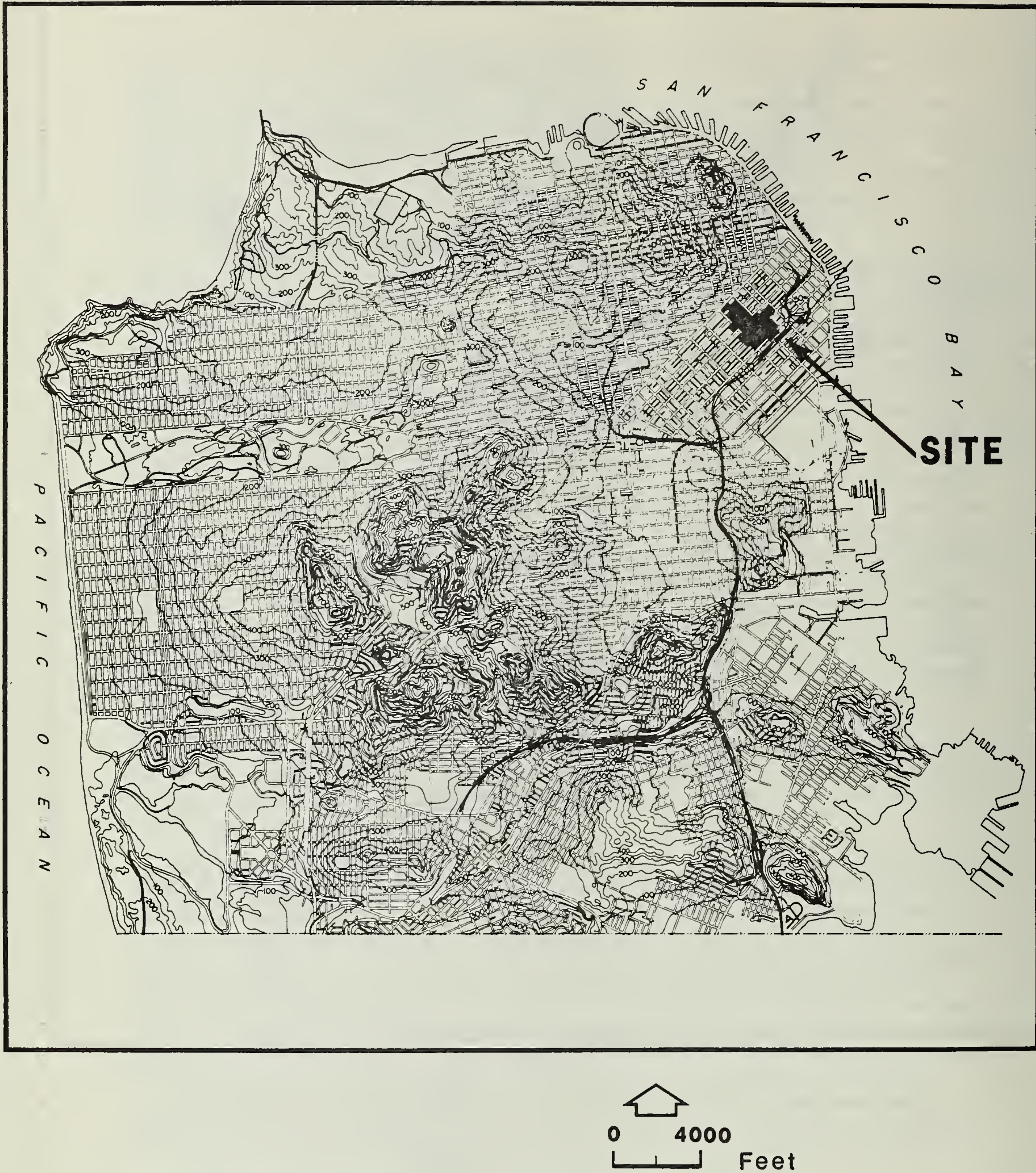
the past five years in conformance with the official redevelopment plan. These include office buildings in the eastern and southern blocks and housing in the blocks west of Fourth Street. The dominant interim use in the area is in the form of temporary parking lots which have a total capacity of nearly 5,800 vehicles. Among the remaining buildings, two have been designated as landmarks by the San Francisco Board of Supervisors--St. Patrick's Church and the Jessie Street Substation--and the latter is on National Register of Historic Places (see Appendix N).

Market Street, at the northern edge of the Project area, is the transit spine of San Francisco. Trains on the 75-mile system of the San Francisco Bay Area Rapid Transit District provide service to Daly City, Richmond, Concord, and Fremont from the lower level of the Market Street subway. Beginning in 1979, the light-rail transit vehicles of the San Francisco Municipal Railway System (Muni Metro) system will operate in the upper level of the Market Street subway, and will provide service to the Sunset, Parkside, West-of-Twin-Peaks, Ocean View, Merced Heights, Ingleside, Eureka Valley, Dolores Heights and Noe Valley areas of the City. Most bus lines serving Eureka Valley, the Sunset, and parts of the Richmond and Western Addition districts also pass along Market Street. Third and Fourth Streets, operating as a one-way couple, are used by important north-south Muni bus lines serving the Southern Pacific Terminal, Hunters Point, Bayview, and Visitacion Valley to the south, and the Financial district, Union Square, Chinatown and North Beach to the north. Mission Street, operating as a transit arterial street,[4] carries most of the bus lines serving the Mission District and independently franchised jitneys. In addition to the local Muni lines, transit service is provided through the site by the Golden Gate Transit buses serving Marin County (on Howard and Folsom Streets) and by Samtrans buses serving San Mateo County (on Mission Street). Buses of the AC Transit District, which serve cities in Alameda and Contra Costa Counties, terminate at the Transbay Transit Terminal at First and Mission Streets, one and one-half blocks east of Yerba Buena Center.

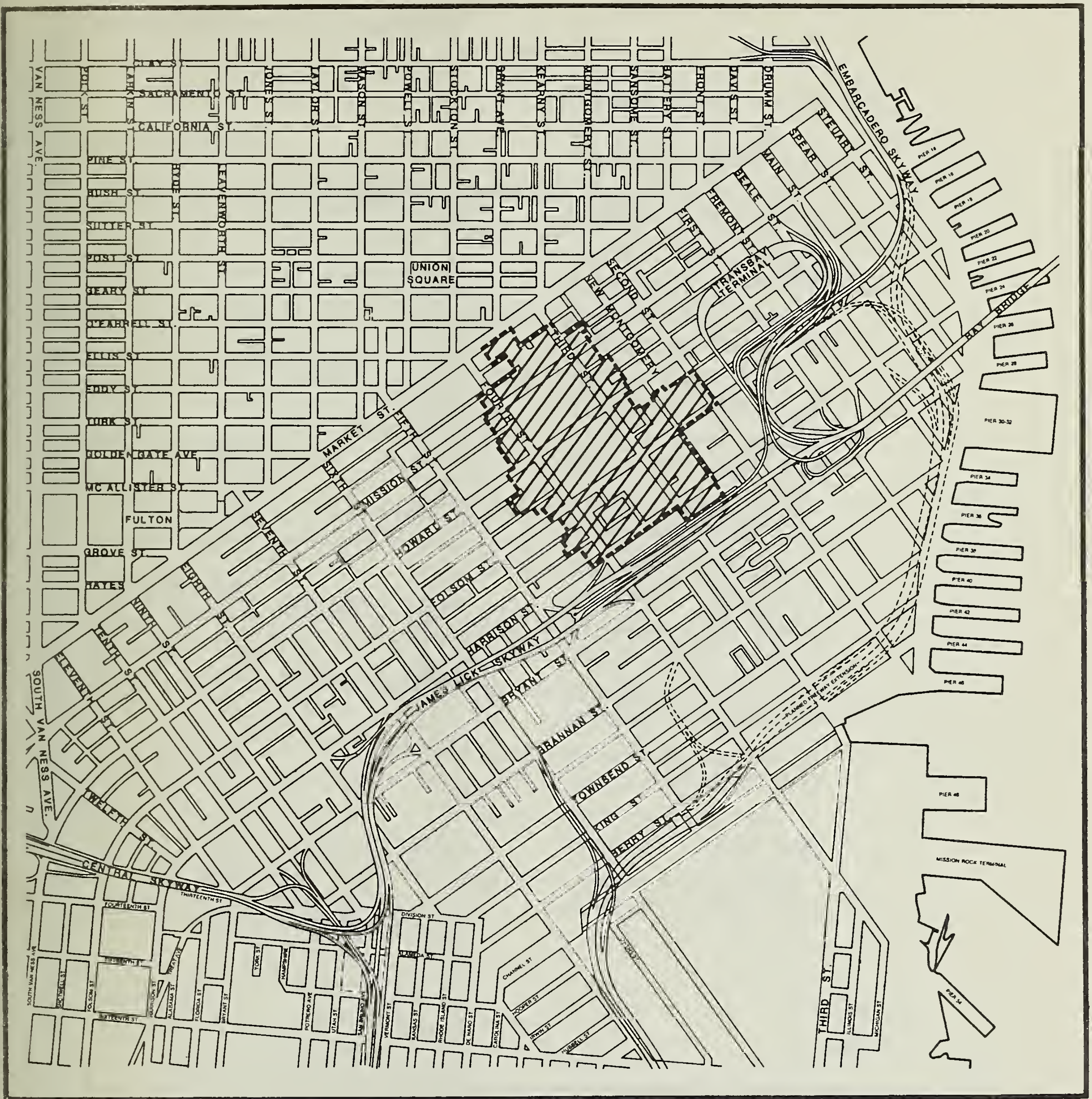
The eastern portion of the Yerba Buena Center site abuts the southern extension of the Financial district along New Montgomery Street, and is the site of further southward expansion of office uses on Hawthorne, Folsom, and Third Streets. The Market Street gateway to the area, opposite Grant Avenue, is at the southeastern edge of the Union Square retail shopping and hotel district, a concentrated downtown activity area. The southern edge of the site is predominantly industrial in use and is dominated by the Bay Bridge approach and Central Skyway structures. West of the Yerba Buena Center dominant uses are either residential or are commercial uses of a type which relate to and support the more intensive Downtown activities. Sixth Street contains numerous retail outlets serving residents of the area, and hotels catering to permanent residents.



REGIONAL LOCATION	III 1



AREA LOCATION	III 2



LEGEND

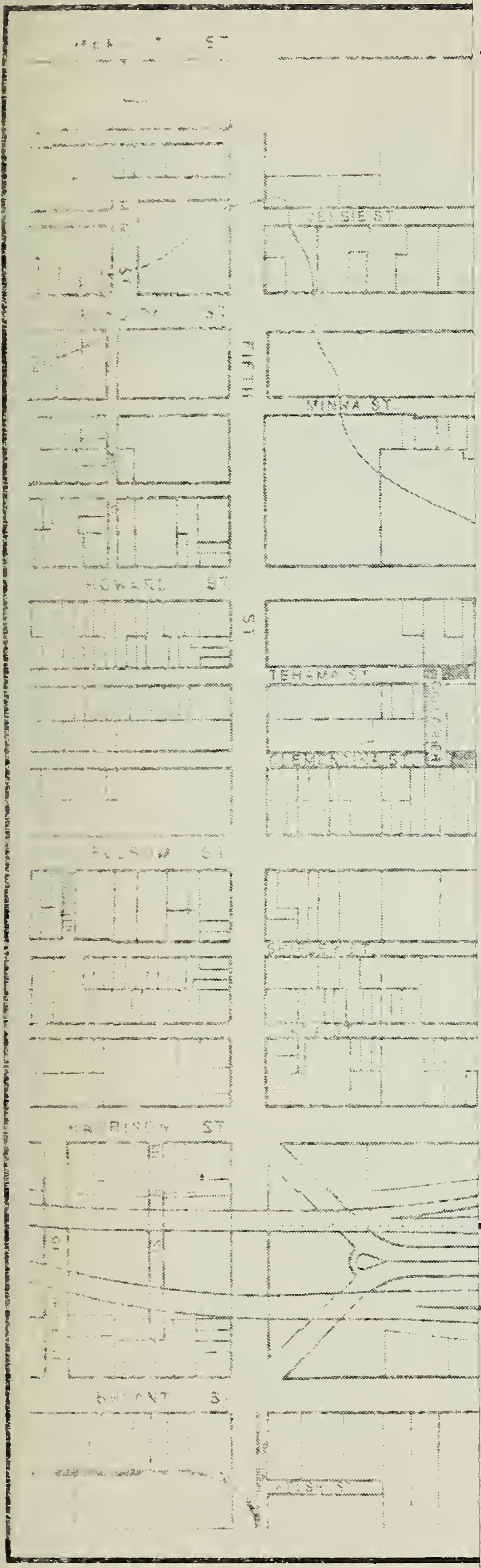
Yerba Buena Center area boundary

0 0.5 Kilometer

0 1800 Feet

N

YERBA BUENA CENTER BOUNDARIES	III 3



LEGEND

Redevelopment area boundary

CB-1 = Central Block One
Assessor's Block 3706

CB-2 = Central Block Two
Assessor's Block 3723

CB-3 = Central Block Three
Assessor's Block 3734

EB-1 = Eastern Block One
Assessor's Block 3707

EB-2 = Eastern Block Two
Assessor's Block 3722

EB-3 = Eastern Block Three
Assessor's Block 3735

SB-1 = Southern Block One
Assessor's Block 3752

SB-2 = Southern Block Two
Assessor's Block 3751

SB-3 = Southern Block Three
Assessor's Block 3750

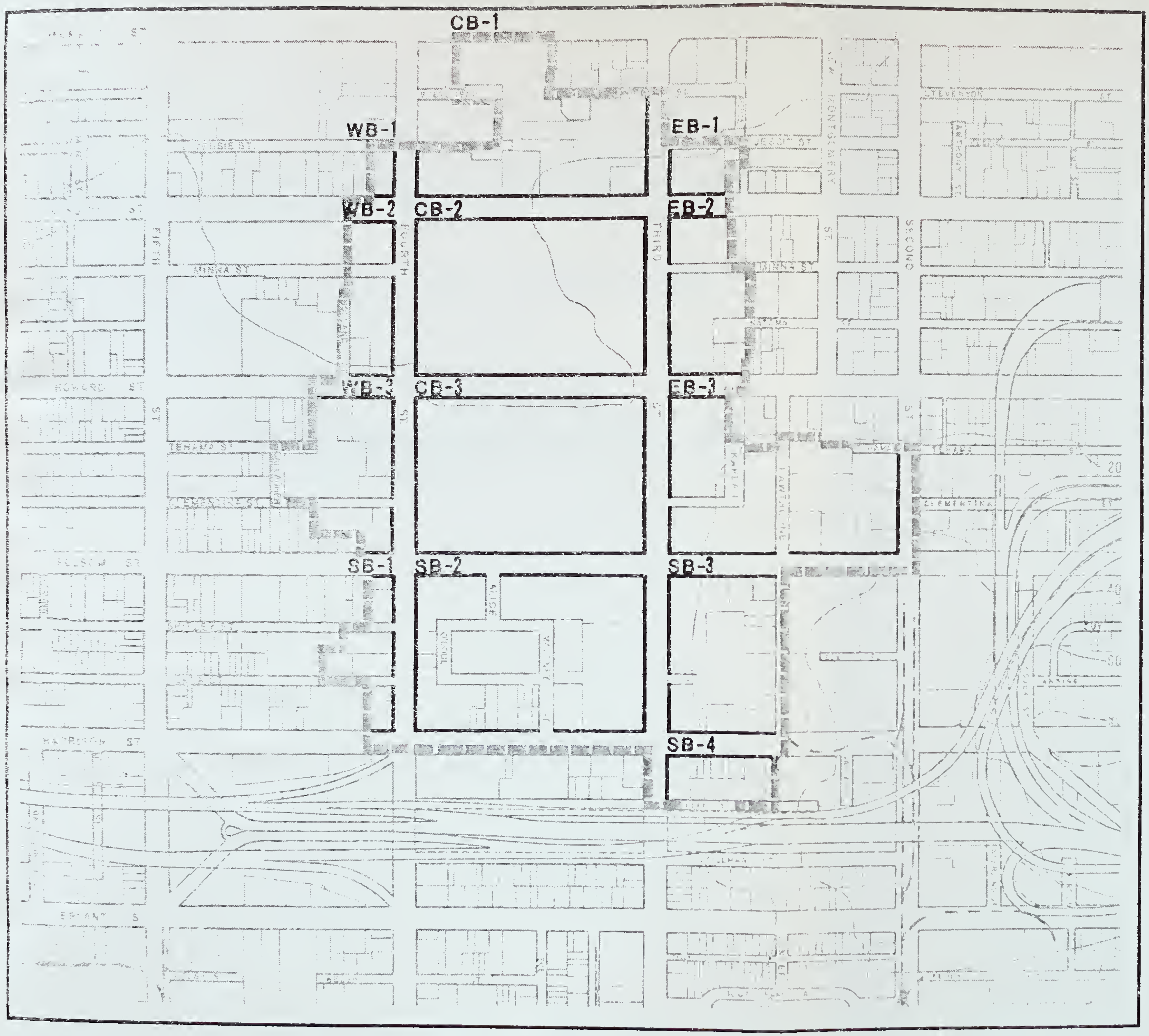
SB-4 = Southern Block Four
Assessor's Block 3763

WB-1 = Western Block One
Assessor's Block 3705

WB-2 = Western Block Two
Assessor's Block 3724

WB-3 = Western Block Three
Assessor's Block 3733

BLOCK NUMBERS
YERBA BUENA CENTER



LEGEND

Redevelopment area boundary

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CB-2 = Central Block Two
Assessor's Block 3723

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EB-1 = Eastern Block One
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EB-2 = Eastern Block Two
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EB-3 = Eastern Block Three
Assessor's Block 3735

SB-1 = Southern Block One
Assessor's Block 3752

SB-2 = Southern Block Two
Assessor's Block 3751

SB-3 = Southern Block Three
Assessor's Block 3750

SB-4 = Southern Block Four
Assessor's Block 3763

WB-1 = Western Block One
Assessor's Block 3705

WB-2 = Western Block Two
Assessor's Block 3724

WB-3 = Western Block Three
Assessor's Block 3733

0 0.5
Kilometer

0 1800
Feet

BLOCK NUMBERS
YERBA BUENA CENTER

[1]For ease of description, and in line with local custom, the northeast-southwest oriented streets such as Mission, Howard, and Folsom are considered as east-west streets in this report, and the northwest-southeast oriented streets such as Third and Fourth are considered as north-south streets.

[2]The natural height of Rincon Hill was originally 120 feet above sea level. Quarrying and cutting carried out in the 1860's, including a 75-foot cut on Second Street, have left its highest point at an elevation of 108 feet and points on its slopes variably reduced in elevation.

[3]Principal streets: Market, Mission, Howard, Folsom, Harrison, Second, Hawthorne, Third, Fourth, Fifth.

[4]Defined by the Transportation Element of the Comprehensive Plan as a route "of major arterial transit lines" (page 24) where interference with transit vehicles by other traffic should be minimized.

PART IV

PROJECT DESCRIPTION

The Yerba Buena Center Redevelopment Project, has been an ongoing urban renewal project (CALIF. R-59) since April 25, 1966 when the Official Redevelopment Plan was originally adopted and approved by the Board of Supervisors of the City and County of San Francisco as Ordinance 98-66. As a consequence of this ongoing process the "Project" under evaluation in this EIS is composed of several parts:

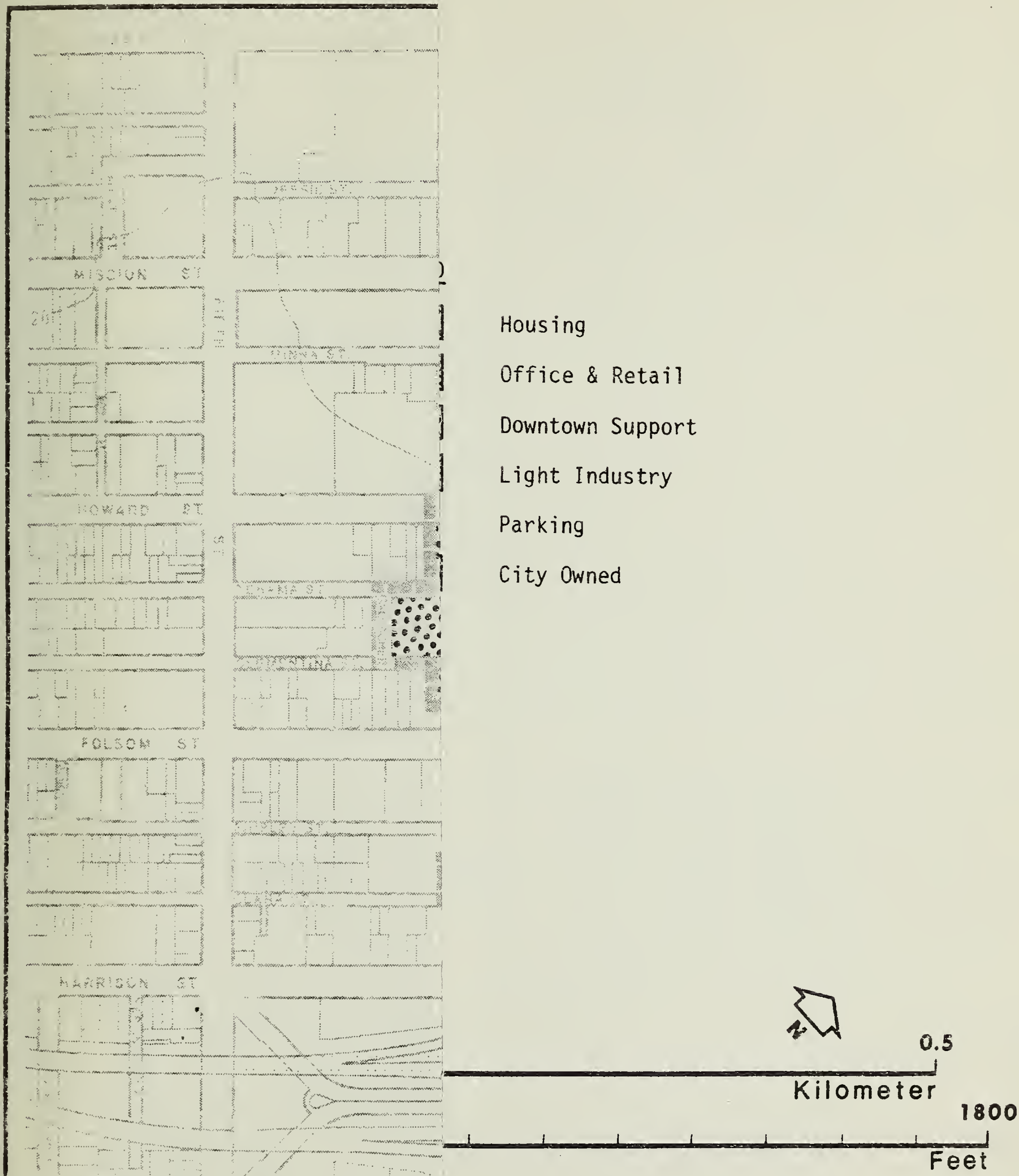
I - The existing Official Redevelopment Plan for the Yerba Buena Center approved Redevelopment Project Area D-1, as originally adopted and amended to date;

II - The principal new developments completed or nearing completion as of October 1977; and

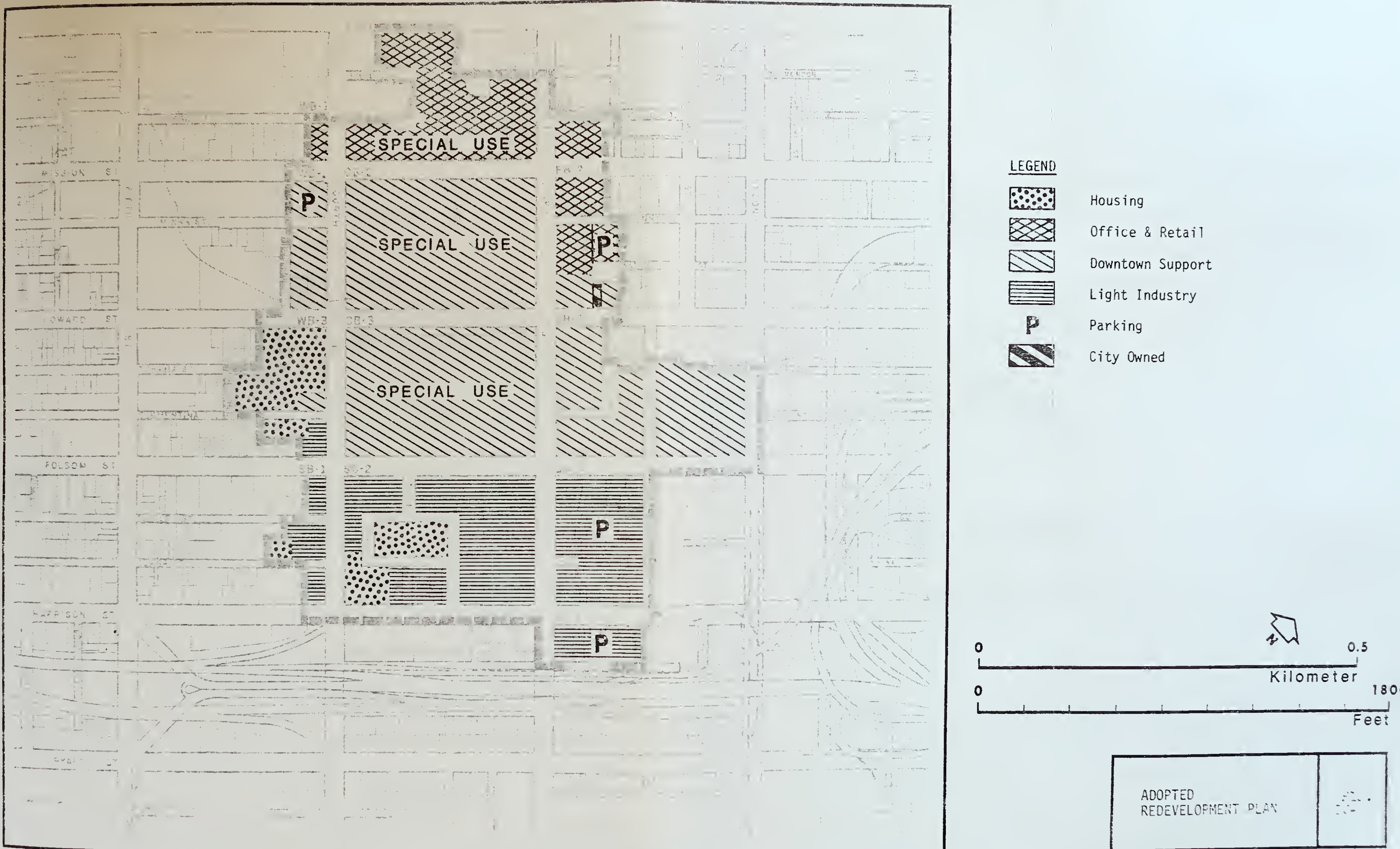
III- The proposed changes to the Urban Renewal Plan being considered by the San Francisco Redevelopment Agency, as contained in the letter from Wilbur W. Hamilton, Executive Director, dated November 22, 1977. (See Appendix I).

I. The boundaries of the existing Urban Renewal Plan remain unchanged from the original Project evaluated in the 1974 EIS and cover some 87.3 acres of land situated to the southeast of San Francisco's financial and downtown retail districts. It consists of three entire centrally-located blocks and portions of ten adjacent peripherially-located blocks. The entire Project is "generally" bounded by Market Street to the north; Fifth Street to the west; Harrison Street and the James Lick Freeway to the south; and Hawthorne, Second and New Montgomery Streets to the east. (Please see Appendix B for the official legal description). Figure IV-1 shows the Adopted Redevelopment Plan as amended to date which identifies the boundaries and general land uses; general in the sense that "Special Use" was used to indicate permitted locations for the originally planned sports arena and convention center. Figure IV-2, Designated Uses, indicates the current status of the redevelopment project and portrays the primary or "designated uses" under the existing Yerba Buena Center Redevelopment Plan which form the foundation of this EIS.

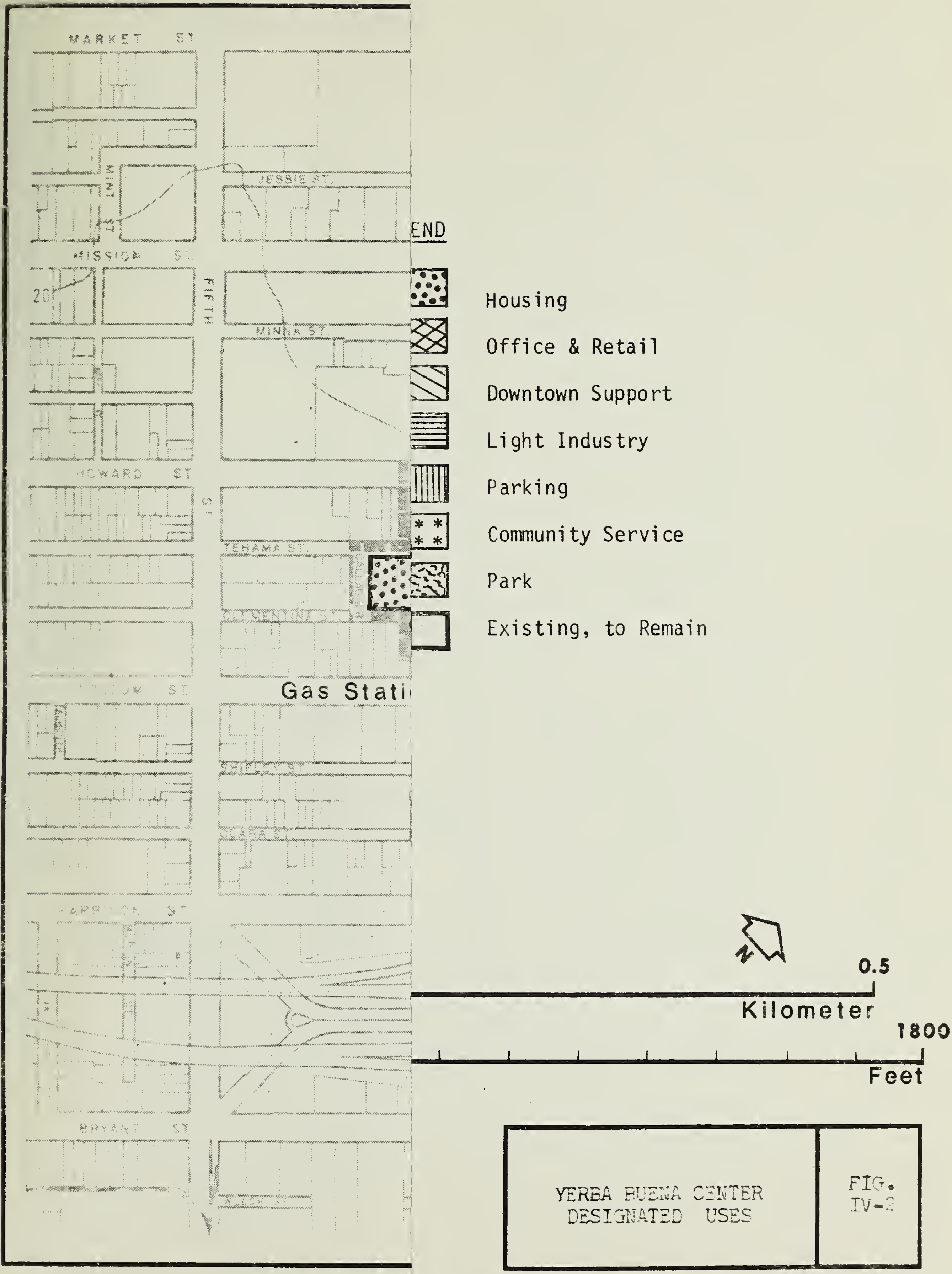
II. The principal developments that have occurred or are committed for future development are identified on two maps (Figures IV-3 and IV-4). The first identifies those parcels where a HUD-approved land disposition agreement for the sale of land for a specific development is currently in existence. The second map reflects the "Committed Uses", showing those parcels of land where the Redevelopment Agency is pursuing the development for a particular or committed use.



ADOPTED
REDEVELOPMENT PLAN

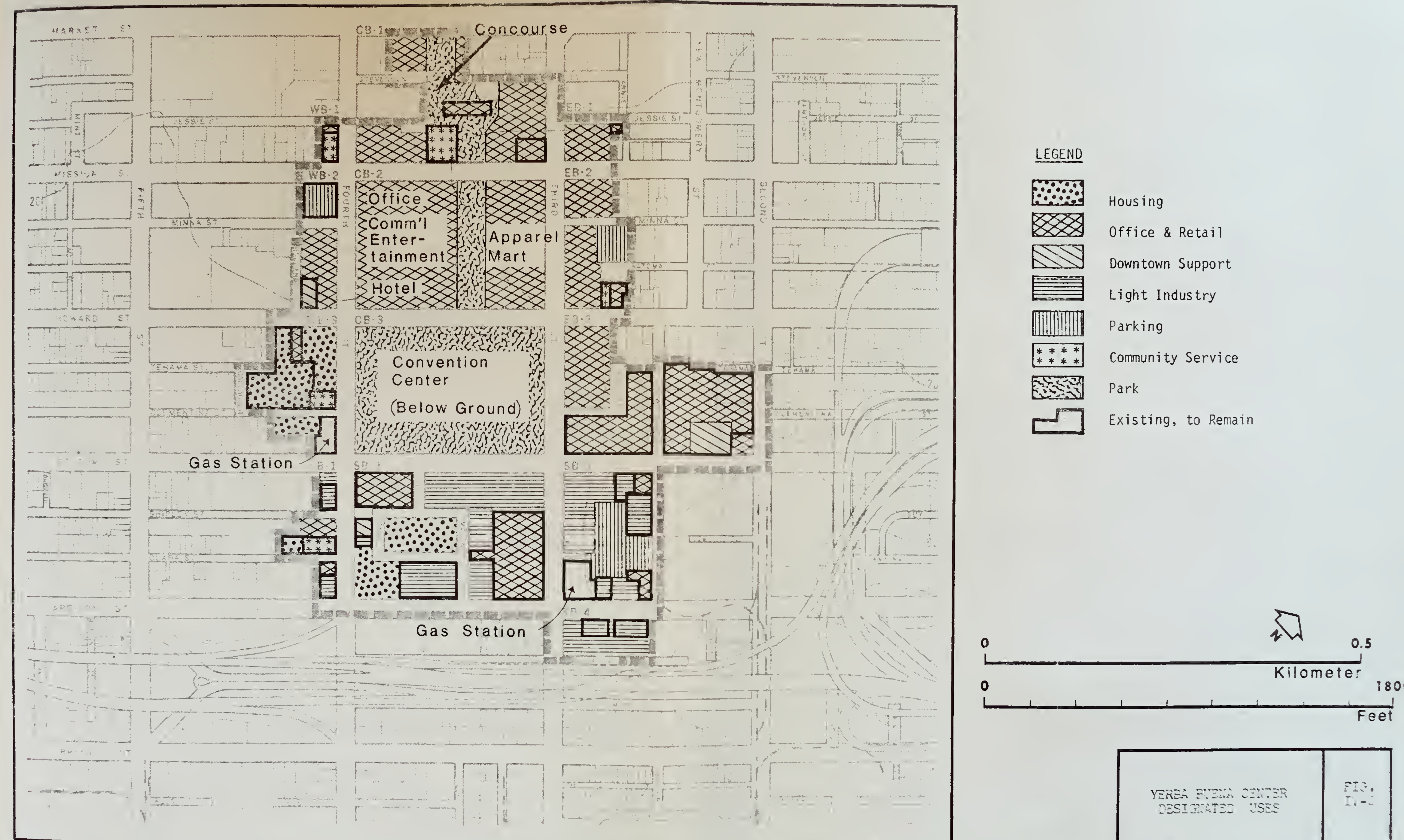


SPECIAL USE
SPECIAL USE
SPECIAL USE
P
P
P
P
MISSION ST
HOWARD ST
FOLSOM ST
HARRISON ST
LEGEND
Housing
Office & Retail
Downtown Support
Light Industry
Parking
City Owned
0
0.5
Kilometer
0
1800
Feet
ADOPTED
REDEVELOPMENT PLAN



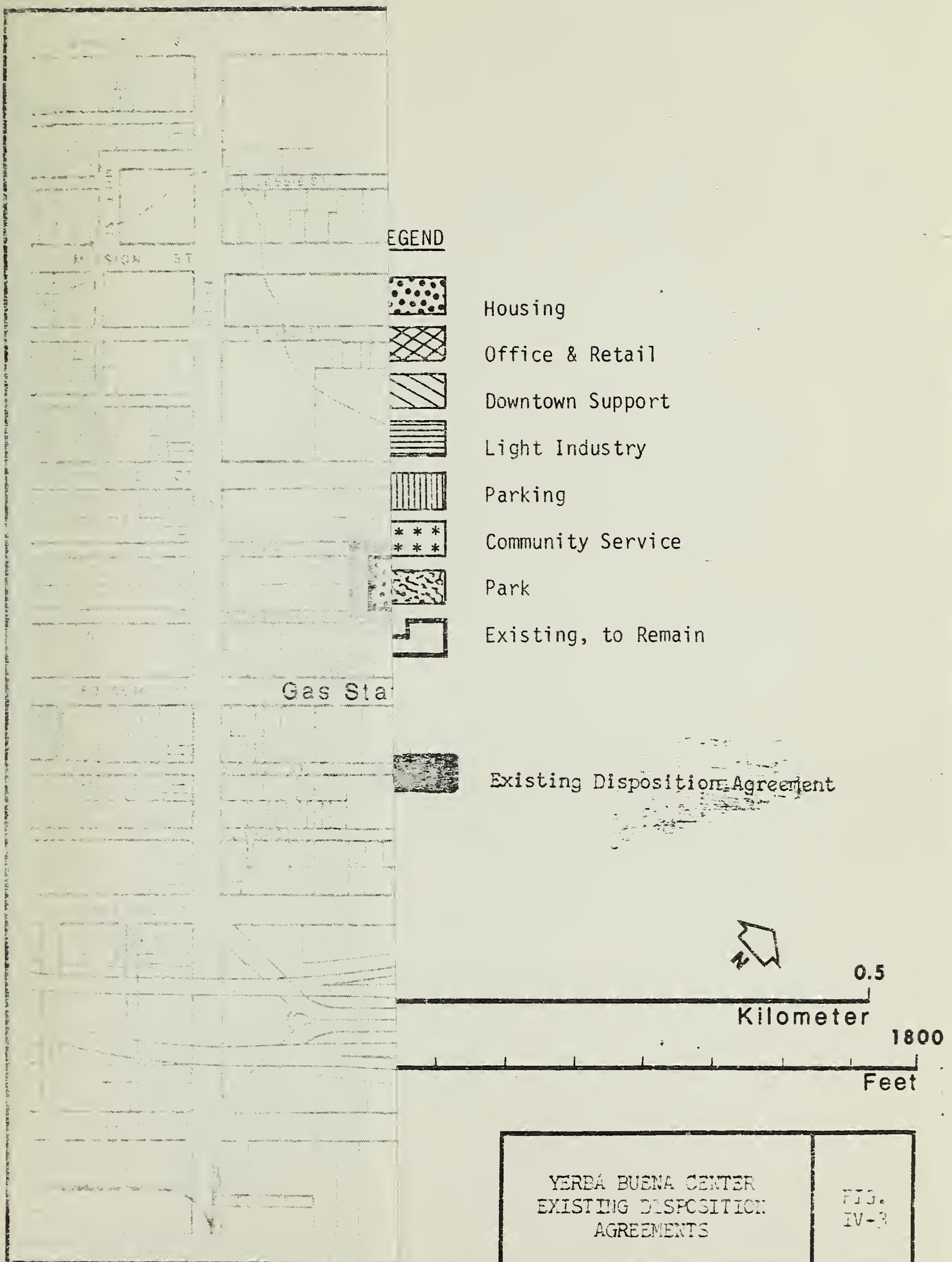
YERBA BUENA CENTER DESIGNATED USES

FIG. IV-2



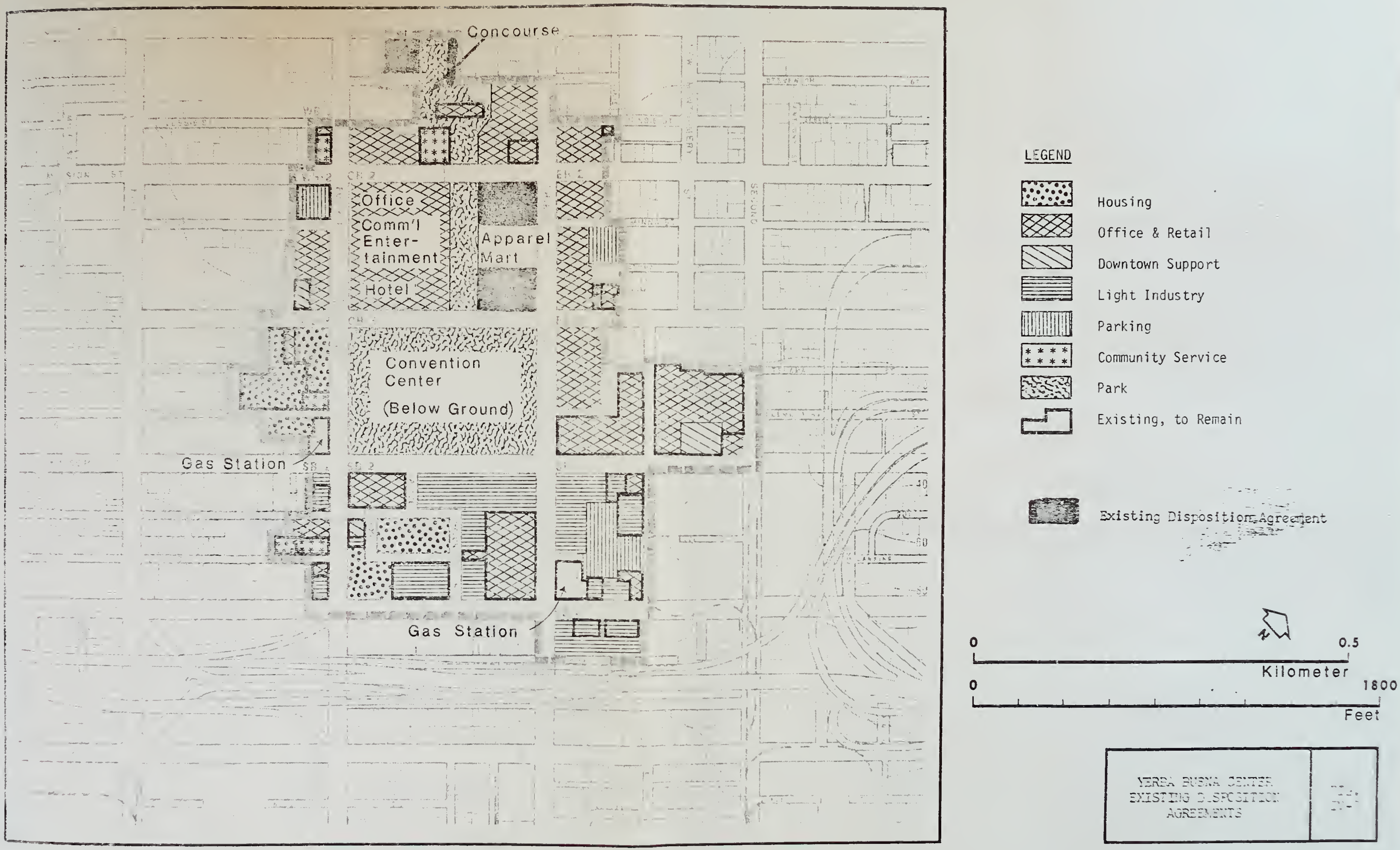
YERBA BUENA CENTER
DESIGNATED USES

FIG. IV-1



YERBA BUENA CENTER
EXISTING DISPOSITION
AGREEMENTS

FIG.
IV-3


Concourse
Office
Comm'l
Enter-
tainment
Hotel
Apparel
Mart
Convention
Center
(Below Ground)
Gas Station
Gas Station
LEGEND
Housing
Office & Retail
Downtown Support
Light Industry
Parking
Community Service
Park
Existing, to Remain
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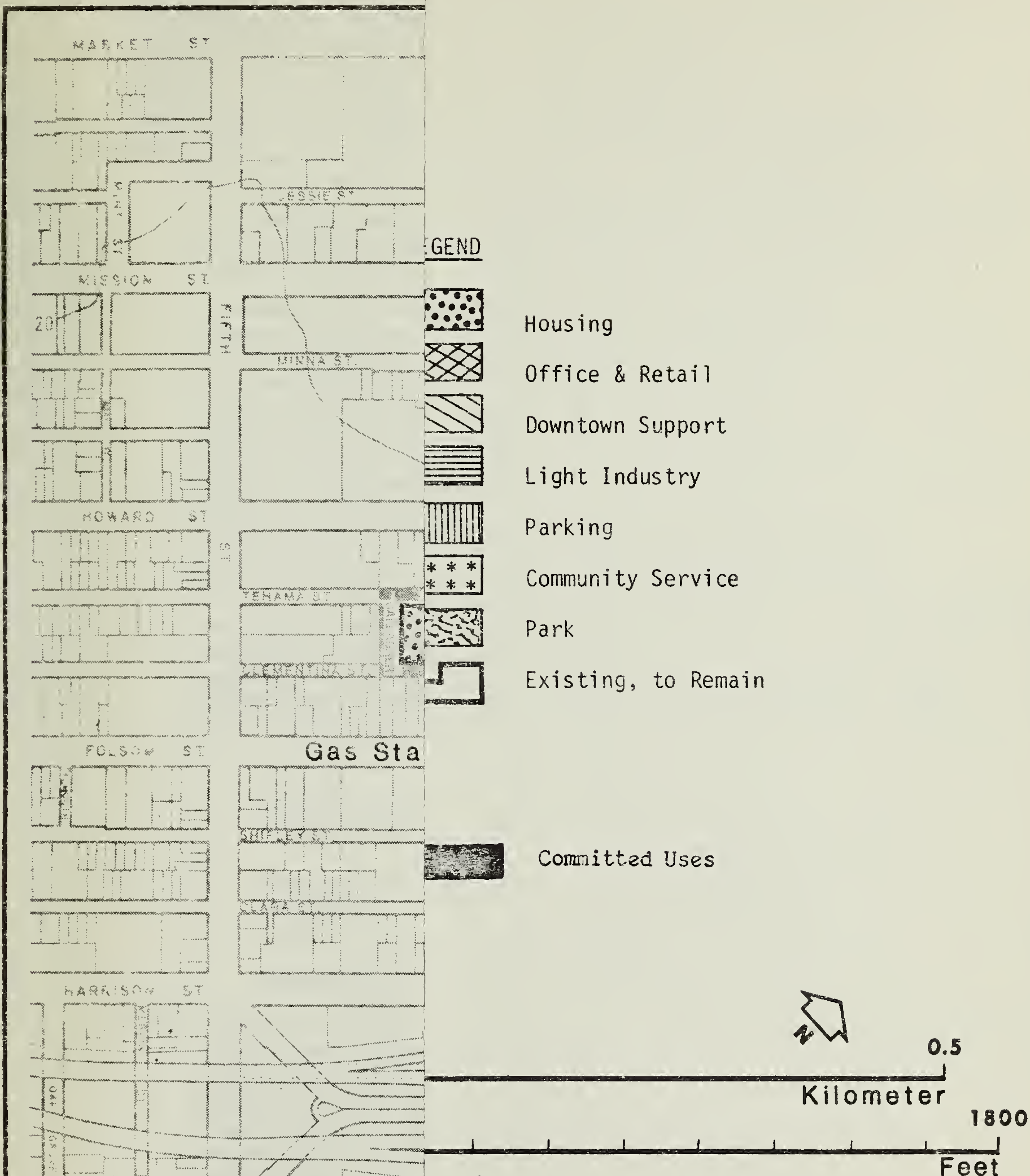
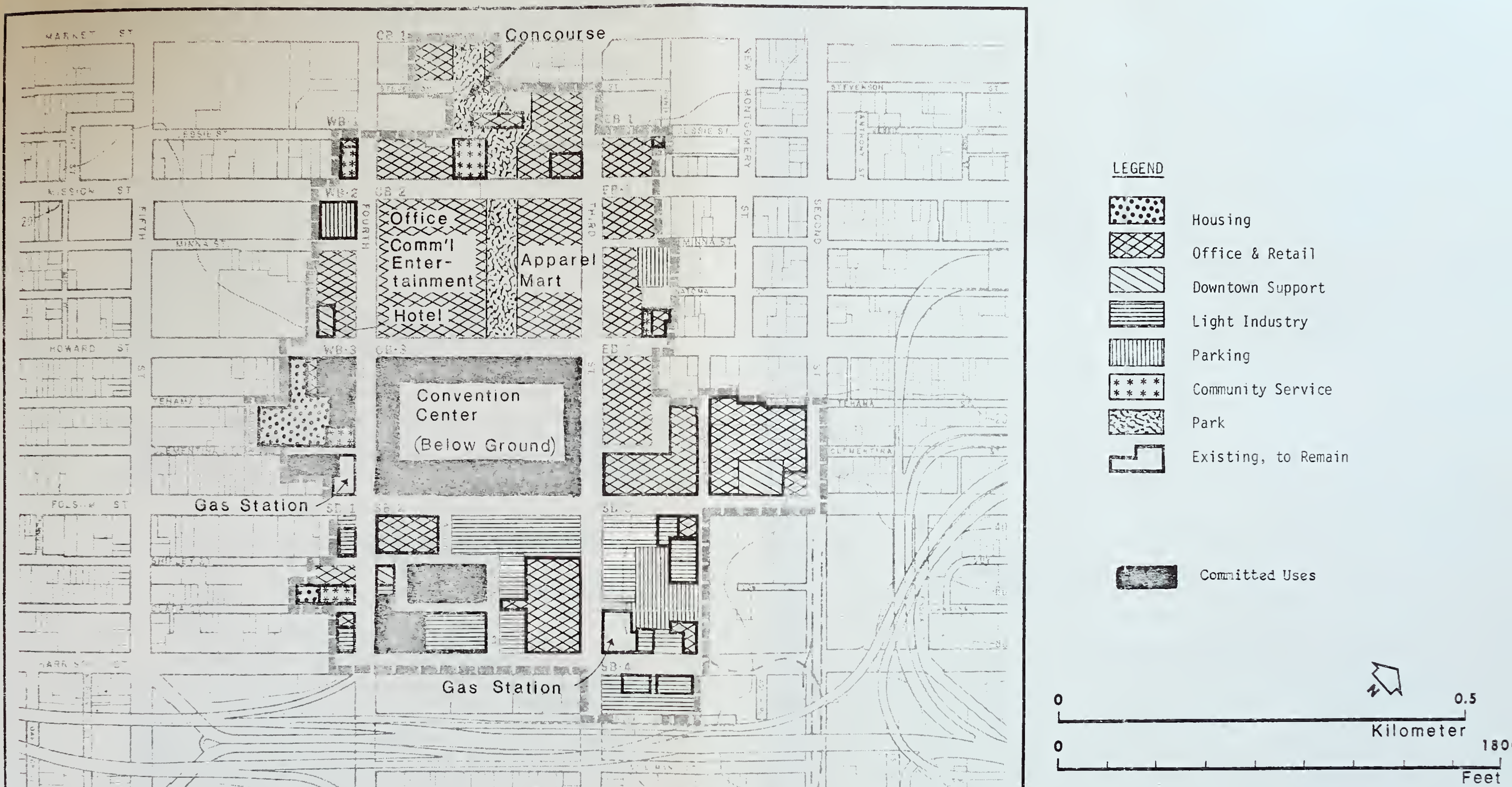
YERBA BUENA CENTER
EXISTING DISPOSITION
AGREEMENTS



YERBA BUENA CENTER
COMMITTED USES

FIG. IV-4



YERBA BUENA CENTER
COMMITTED USES

FIG. [illegible]

III. The proposed changes to the Urban Renewal Plan currently under consideration by the Redevelopment Agency are illustrated on the map entitled "Variant or Permitted Uses from Designated Uses" (Figure IV-5). To implement the proposed Urban Renewal Plan changes, the following development assumptions are included within the concept of the Project. These are the principal factors in determining the Project impaction:

a. The sports arena is no longer in the development program;

b. A convention center will be developed on Central Block #3. The convention center will be partially underground, if financially feasible, and will contain no on-site parking;

c. A recreation/entertainment complex may be developed on the surface of the convention center and on the western 2/3rds of Central Block #2. If the committed use (the Apparel Mart) does not materialize, the recreation/entertainment complex may occupy all of Central Block #2 and may contain the same number of on-site parking spaces as are now programmed for the Apparel Mart in accordance with City Planning Code requirements for that use. The complex will be composed of two- and three-story buildings, with approximately 50 percent land coverage and contain no on-site parking other than that mentioned above. The complex may contain a mixture of recreation, commercial, entertainment, and cultural uses;

d. The underground parking garage previously proposed under the Convention Center/Sports Arena Complex has been eliminated. Automobile parking for the convention center and recreation/entertainment complex is analyzed to be accommodated in one or more of the following ways:

   1. Provided by adjacent private development,

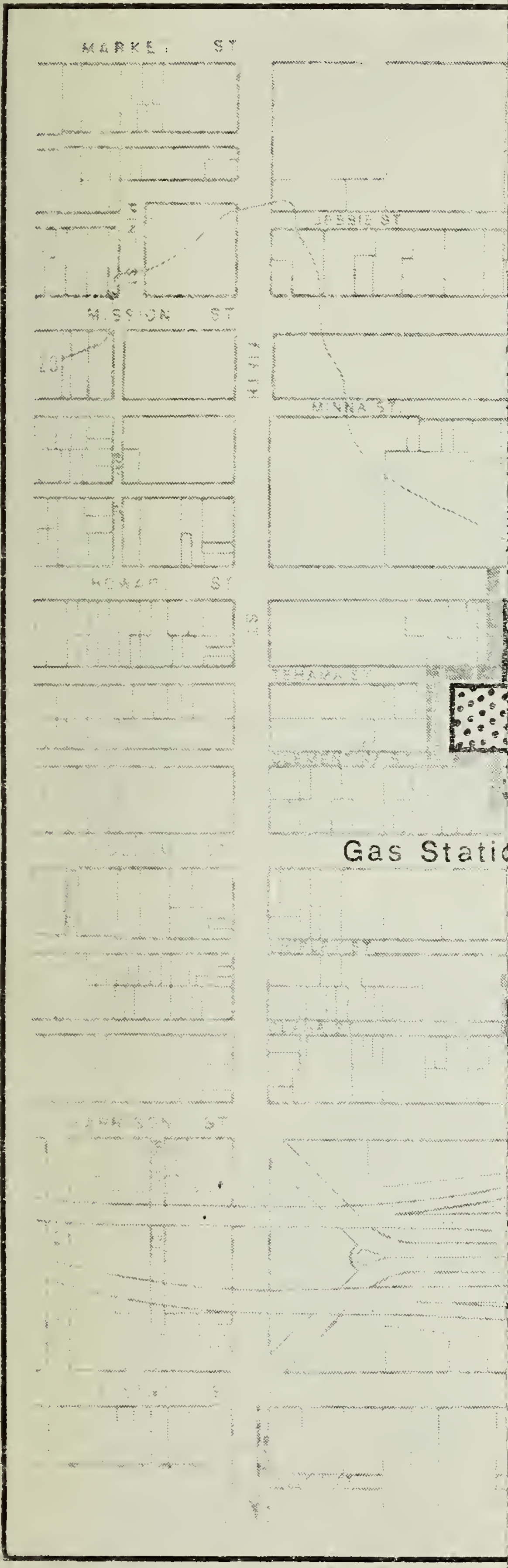
   2. Provided partially by adjacent private developers and partially by the City's parking authority,

   3. Provided, at an adjacent location, by the City's parking authority.

   4. Provided by private shuttle bus services.

   5. Provided by increased use of public transportation.

e. There are several structures which have or may have historical/architectural significance. The St. Patrick's Church will remain in its current use and condition. The old Police Substation (now owned by the Salvation Army) is to be demolished under the terms of the owner-participant agreement. However, the Salvation Army has indicated its desire to retain the building as a Senior Activities Center and its retention is under consideration. The Jessie Street Substation and the Mercantile Building may be retained and rehabilitated (for reuse as office/retail space) if financially feasible. (See the Historic Preservation assessment for a full discussion.)



ND

- Housing
- Office & Retail
- Downtown Support
- Light Industry
- Parking
- Community Service
- Park
- Existing, to Remain

Gas Stati

IANT OR PERMITTED USES FROM DESIGNATED USES*

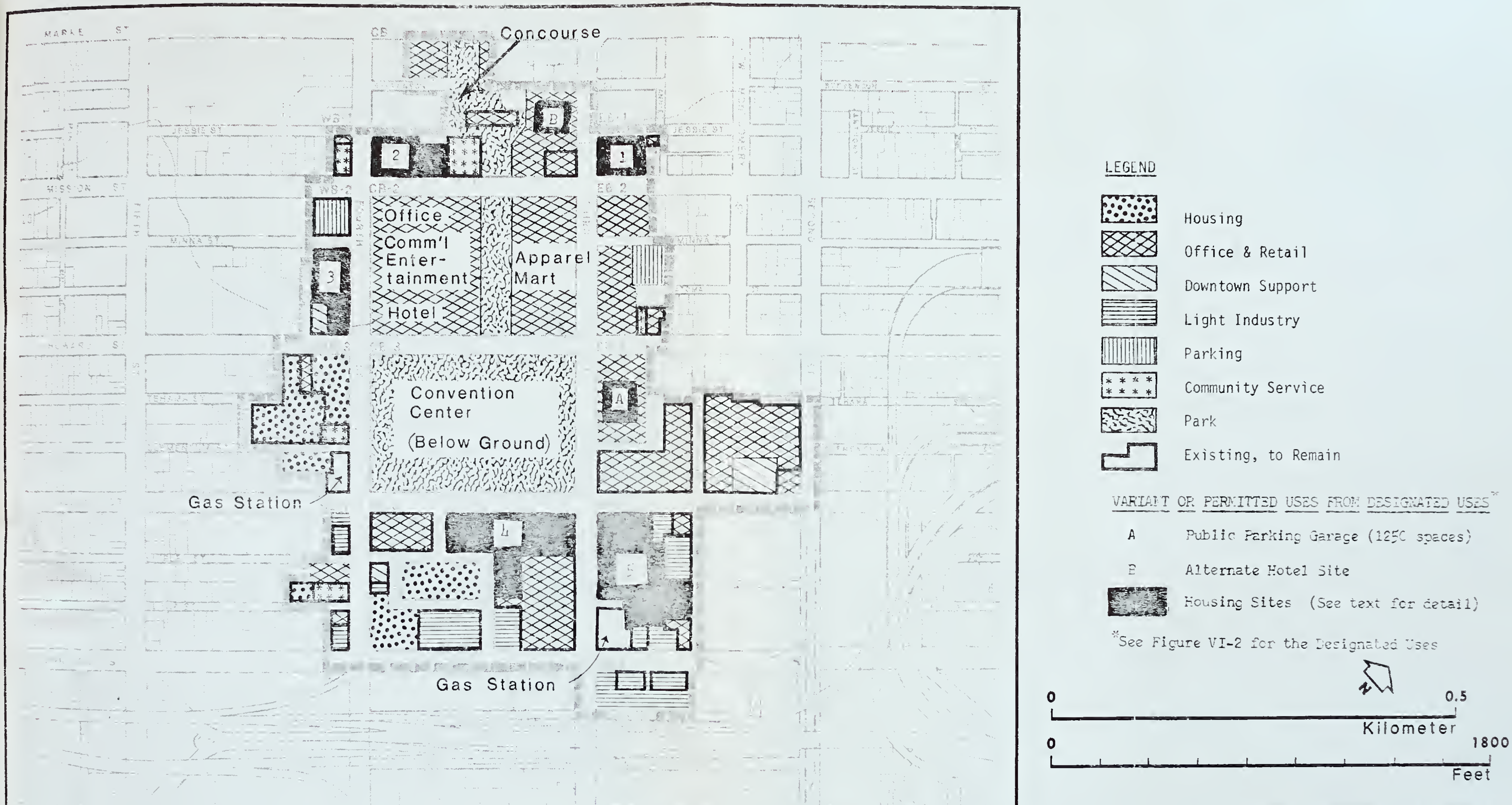
- Public Parking Garage (1250 spaces)
- Alternate Hotel Site
- Housing Sites (See text for detail)

e Figure VI-2 for the Designated Uses

0.5 Kilometer

1800 Feet

YERBA BUENA CENTER PERMITTED OR VARIANT USES FROM DESIGNATED USES	FIG. IV-5



YERBA BUENA CENTER
PERMITTED OR VARIANT
USES FROM
DESIGNATED USES

FIG.

f. The five land parcels indicated as possible alternate permitted housing sites may contain up to a total of 900 dwelling units. (See Figure IV-5). Each site is analyzed as containing up to the following number of dwelling units:

1. Site 1 - up to 400 dwelling units,

2. Site 2 - up to 100 dwelling units,

3. Site 3 - up to 100 dwelling units,

4. Site 4 - up to 120 dwelling units, and

5. Site 5 - up to 180 dwelling units.

At the present time, no further elderly housing is contemplated. The housing units will be primarily for families and single individuals, primarily rental units with some sales units, and with the majority of the units being available at market rate with the possibility of a limited amount of subsidized units.

General Description of Designated Uses

The predominent element in the "Project" is the character of development proposed in the three blocks which comprise the 25-acre central blocks area, which extends from Market Street opposite Grant Avenue on the north to Folsom Street on the south. It is bounded generally by Third Street on the east and by Fourth Street on the west (see Figure III-4, Section III).

A principal feature of the central blocks (see Figure IV-2) would be a broad pedestrian concourse, occupying 163,000 square feet of land area, which would extend southward from Market Street in a midblock location and across Mission and Howard Streets to the entrance lobby of the Convention Center and exhibit hall which would be located on the south site of Howard Street in Central Block 3.

In the block designated CB-1, the pedestrian concourse would consist of a landscaped and paved plaza extending southward from the Market Street gateway to Yerba Buena Center, opposite Grant Avenue, where the easternmost entrance to the mezzanine concourse of the Powell Station of the Bay Area Rapid Transit system (BART) and Muni Metro system is located. It would extend around and through the red brick Jessie Street Substation and alongside St. Patrick's Church to Mission Street. In addition to the church, the pedestrian concourse would be adjoined by a combination of office use (1,877,000 square feet) and retail commercial uses (238,000 square feet).

In CB-2, between Mission and Howard Streets, the Project provides for an apparel mart on the eastern third of the block, occupying 151,800 square feet of land area. It would contain up to 797,000 square feet of office space and 266,000 square feet of retail commercial uses[2]. The multi-storied wholesale mart would be topped by 50 market-rate dwelling units.

TABLE IV-1
Areas and Quantities of Use - Sq. Ft.
At Maximum Development
1988

	(X) Existing	(Y) Committed	(Z) Projected	(X+Y+Z) Total of Uses
Office	1,466,354	81,800	6,214,450	7,762,604
Retail Commercial	74,292	9,000	676,550	759,842
Community Service	166,850	-	-	166,850
Pedestrian Concourse	-	-	163,220	163,220
Hotel Rooms	-	-	700 rooms	700 rooms
Convention Facility	-	-	370,000*	370,000*
Market Housing	-	-	50 DU's	50 DU's
Housing for Elderly	534 DU's	602 DU's	-	1136 DU's
Family Housing	-	-	-	-
Downtown Support Service	98,950	-	-	98,950
Light Industrial	137,300	-	1,077,450	1,214,750
Downtown Support Parking	145,829	-	66,400	212,229
Public Parking	100,800 (280 sp)	-	453,600 (1260 sp)	554,400 (1540 sp)
Park	-	-	454,300**	454,300**
Commercial Entertainment	-	-	400,000	400,000

* Total floor area of convention facility including meeting rooms, loading areas and storage, is 612,000 sq. ft.

** A park may be partially developed over the convention facility.

3. The 700-room hotel, currently designated to be on the southwestern portion of Central Block 2 may be permitted on the southeastern portion of Central Block 1 instead of the designated office and retail use. The southwestern portion of Central Block 2 would be developed as office-retail.

4. As discussed above, the following sites may be developed into housing as indicated:

   a. Site 1, currently designated office and retail, up to 400 dwelling units.

   b. Site 2, currently designated office and retail, up to 100 dwelling units.

   c. Site 3, currently designated office and retail, up to 100 dwelling units.

   d. Site 4, currently designated light industry, up to 120 dwelling units.

   e. Site 5, currently designated light industry and parking, up to 180 dwelling units.

Building Heights

Several relatively tall buildings would be possible under maximum development of the Project. These would consist of committed uses exempted from current Planning Code height limits and of uses built up to the maximum heights permitted. Thus the office tower at 755 Market Street, next to the pedestrain gateway to Yerba Buena Center, would be 36 stories high, and other office towers in the central and eastern blocks would range in height from 24 to 46 stories. Industrial and downtown support buildings could range from five to eight stories, and housing structures would range from eight to 11 stories in height.

The Urban Renewal Plan requires that the height provision of the City Planning Code shall be applicable to any housing constructed, and in no case shall development of the housing sites exceed the current standards of the City Planning Code.

The projected heights for each designated-use parcel are shown in Appendix C.

[1] The Redevelopment Plan for Yerba Buena Center was originally adopted by the Board of Supervisors of the City and County of San Francisco by Ordinance No. 98-66 on April 25, 1966. The plan has been amended four times: by Ordinance No. 201-71 adopted on July 26, 1971; by Ordinance No. 393-73 adopted on October 9, 1973; by Ordinance No. 386-76 adopted on September 13, 1976; and by Ordinance No. 367-77 adopted on August 8, 1977. Figure IV-2 reflects all four amendments.

[2] This entire analysis is based on the maximum area or unit quantity allowable in each category of use.

HISTORY OF YERBA BUENA CENTER AREA

The site of Yerba Buena Center was originally a series of windblown sand dunes typical of much of early San Francisco. Its early settlement resulted in a mixture of residential, commercial, and industrial uses. It was totally destroyed by the earthquake and fire of 1906 but was completely rebuilt with a mixture of uses, including residential. When the first zoning ordinance was adopted in 1921, most of the area was placed in a light industrial classification, except that portion nearest to Market Street which was classified as commercial. Residential uses were not specifically recognized by the zoning pattern but they were permitted in the commercial and light industrial zones. As residential uses decreased gradually, some of the institutions and facilities which served them moved from the district or ceased to exist.

OFFICIAL DESIGNATION UNDER THE CALIFORNIA COMMUNITY REDEVELOPMENT LAW

The California Community Redevelopment Law was adopted by the California legislature in 1945 as a basis for fostering new building and development programs after World War II in urban areas identified as blighted under terms of the law. In 1946 the San Francisco Board of Supervisors established a Redevelopment Agency and subsequently designated redevelopment study areas, after public hearings, within which redevelopment project areas were designated.

In 1953 the Board of Supervisors acted upon recommendations of the Redevelopment Agency, with the concurrence and approval of the City Planning Commission, and designated 19 blocks as Redevelopment Area "D" in the South-of-Market district.[1] The official policy was twofold. One purpose was to remove residential uses from the area which, because of the mixture of industrial and commercial service uses, and because of their location on narrow alleys and small lots, were considered to provide a substandard and blighted living environment. The second purpose was to create larger parcels of land for industrial and downtown support uses, to improve the industrial environment, and to improve the supply of industrial land. In 1955 four blocks were added to the Area for additional study, in response to a privately initiated scheme for completely clearing entire blocks, not for industrial use, but for a large-scale Rockefeller Center type of development with office buildings, a hotel, a convention center, and retail shops. Faced with a demand by groups opposed to total clearance treatment to rescind the designation of Area "D" altogether, the Board of Supervisors reduced the area covered by the designation, but retained the designation on twelve and one-third blocks which were eligible for federal capital grants under the Housing Act of 1954.[2] A subsequently developed project proposal and an application for renewal funds in September 1958 was unacceptable to the federal Urban Renewal Administration, however, and the area was subsequently dedesignated as a blighted area in order to encourage private development.

REDESIGNATION

By 1960 the conceptual thrust of planning in the area was changed from an emphasis on industrial and support uses, of which many were moving to outlying and suburban locations, to a broader spectrum of uses which could be attracted to the area and contribute to the employment base of the City. The primary focus of this concept was a convention center, a sports arena, and related public facilities. In 1961 Area "D" was redesignated by the Board of Supervisors,[3] with different boundaries which encompassed the area north of the Bay Bridge Skyway, between Second and Fifth Streets, up to Market Street. In 1962 the Redevelopment Agency received a federal grant for survey and planning activities.

THE DOWNTOWN PLAN

In 1963 the Department of City Planning published General Plan proposals for Downtown San Francisco. The proposals represented the first time that the South of Market area was tied directly to Market Street and the area north of Market in an officially sponsored conceptual plan. Prominent in the features of the plan was a network of pedestrian ways including a Grant Avenue Mall and a "New Grant Avenue... beginning at Market Street and continuing over Mission, Howard, and Folsom Streets, using moving sidewalks, or other similar forms of shuttle ... to link the core area with new developments and uses in the redevelopment area." The plan map indicated a park in the central half of the block between Howard and Folsom Streets. A conceptual "design plan" published concurrently broadened the park area to two blocks and suggested a sports arena and convention center south of Folsom Street.

THE FIRST PLAN FOR YERBA BUENA CENTER

In early 1964 the Redevelopment Agency and its planning consultants, Livingston and Blayney, completed a preliminary conceptual and design plan for Yerba Buena Center, the name given then by the Agency to the project area. It provided for a generally open pedestrian space in the central blocks between Third and Fourth Streets leading to a convention and exhibit hall between Howard and Folsom Streets, and hotels, offices and retail space on either side. A preliminary project plan, indicating the public facilities under the category of special use, and designating Project Area D-1, was adopted by the Board of Supervisors in 1966.[4]

THE KENZO TANGE DESIGN PLAN

A federal urban renewal grant reservation was authorized by the Department of Housing and Urban Development in 1966, after which detailed planning was undertaken. In 1967 the Redevelopment Agency assembled a consultant design team whose principal member was Kenzo Tange of Tokyo, and whose principal local assistant was Gerald M. McCue & Associates. Based on guidelines established in the first conceptual plan of 1964, a

design plan was produced which provided for a 350,000 square foot exhibit hall, a 14,000-seat sports arena, an 800-room hotel, a 2,200-seat theater, 4,000 parking spaces, office buildings, shops, and pedestrian malls and plazas, all of which met the Redevelopment Agency criteria to integrate large-scale public uses with economically productive private development and to provide a "satisfying environment for business and pleasure." Emphasis was given to ease of pedestrian movement and quality of pedestrian environment.

SELECTION OF DEVELOPERS

In mid-1969 proposals were solicited internationally by the Redevelopment Agency for the central blocks of Yerba Buena Center. In October 1970 Schlesinger-Arcon/Pacific, headed by Albert Schlesinger and Lyman Jee, was selected by the Redevelopment Agency to develop the public and private facilities in the central blocks.[5] In mid-1971 the City chose to develop the public portions of the central blocks directly and Arcon/Pacific, Ltd. remained the selected developer of the parcels in the central blocks slated for private ownership and use. Parcels in the peripheral blocks were programmed for marketing on a fee-title basis. In addition, property owners in the peripheral blocks were given the option of bringing their buildings into compliance with the standards of the redevelopment plan under owner participation agreements with the Redevelopment Agency or of rebuilding in a manner consistent with the redevelopment plan.

The principal new developments in the peripheral blocks which were completed or substantially completed by October 1977 consist of the Pacific Telephone Company accounting and computer service building at Hawthorne and Folsom Streets, the General Electric Company at 55 Hawthorne Street, and the United California Bank at Hawthorne and Folsom Streets; the Pacific Telephone Company northern regional headquarters building at Third and Harrison Streets; and the American Telephone Company long-lines building at Fourth and Folsom Streets; a Chevron automobile service station at Third and Harrison Streets; a Union automobile service station at Fourth and Folsom Streets; an addition to the Fifth and Mission parking garage at Fourth and Mission Streets; and the Downtown Center of the San Francisco Community College at Fourth and Mission Streets.

LITIGATION

When planning and implementation of the plans for Yerba Buena Center reached the point of property acquisition and relocation of businesses and residents, several suits were filed in local and federal courts. Some involved prolonged litigation and resulted in substantial delays to the scheduled property acquisition, disposal, and construction programs. Currently, all suits but two have been settled. Settlement agreements have resulted in changes in the plan and in the implementation program and schedule. The principal cases and their results are described below.

a. Silver vs. Board of Supervisors. This was a validation suit filed in Superior Court in 1967 by Louis Silver, owner of the Milner Hotel at Fourth and Mission Streets, charging that there was insufficient evidence to support the findings of Ordinance No. 98-66 which designated the South-of-Market Area D-1 project boundaries and adopted a preliminary plan. The Court initially found the Redevelopment Plan to be valid; this judgment was affirmed on appeal. A petition for hearing in the Supreme Court was denied in 1969.

b. TOOR vs. HUD. In 1970, Tenants and Owners in Opposition to Redevelopment (TOOR) filed an action in the U. S. District Court against the Redevelopment Agency and HUD relating to the displacement and relocation of persons living within the Yerba Buena Center redevelopment area.

On July 19, 1973, a final order and judgment was entered dismissing the complaint with prejudice and approving a settlement agreement dated May 15, 1973. Under that agreement the Agency agreed to provide four additional housing sites and reaffirmed its commitment to provide 1500 new or rehabilitated low-income housing units within the City and County of San Francisco. The agreement also established procedures for the relocation of remaining project residents.

c. San Francisco Tomorrow et al. vs. Romney. On January 13, 1972 two groups filed an action in the U. S. District Court alleging that HUD failed to file an environmental impact statement for Yerba Buena Center as allegedly required by Section 102(2)(c) of National Environmental Policy Act (NEPA).

That action was dismissed on the grounds that the federal act required to bring NEPA into play, i.e., the Loan and Grant Agreement between HUD and the Agency, was taken prior to the adoption of NEPA in 1969. An appeal was taken to the U. S. Court of Appeals, which affirmed the dismissal on January 18, 1973.[6]

d. Duskin vs. Alioto, and Williams vs. City and County of San Francisco. In 1972, a group of taxpayers filed actions against the City and County of San Francisco in the Superior Court challenging the execution of the original 1972 financing agreement on several grounds. These actions were subsequently consolidated with an action brought by the Agency (Redevelopment Agency vs. All Persons Interested) and were dismissed with prejudice on November 12, 1974, on the basis of a settlement agreement dated August 28, 1974, which placed restrictions on the financing of the planned public facilities and dropped the sports arena complex. The settlement also obligated the Redevelopment Agency to amend the Redevelopment Plan to add

housing on up to eight sites and to "take all steps necessary to induce the development of up to maximum of 900 units of market rate housing." The financing arrangement on which this settlement was premised was based on a bonding program for public facilities which is no longer valid in the light of other subsequent plan and program changes.

e. C. Starr, et al., vs. City and County of San Francisco. In 1975, the Board of Supervisors adopted ordinances authorizing the City to enter into a project lease and execute a repayment contract. The lease provided that the Agency would issue bonds not to exceed $210,000,000 for constructing facilities for Yerba Buena Center and that the Agency would lease the facilities to the City. The lease provided that the City would pay a base rental consisting of taxes, administrative and maintenance costs. Financing was to be through a special fund consisting of designated tax revenues and income derived from the facilities. Such funds were to be applied to repaying the outstanding loan to the Agency from the Department of Housing and Urban Development (HUD). The repayment contract committed the City to make up any deficiencies in the repayment funds through ad valorem property taxes and other general funds.

A suit was filed to void the project lease and the repayment contract. The trial court upheld the validity of both contracts and that judgment was appealed. On July 29, 1977, the appellate court upheld the validity of the project lease, but voided the repayment contract as being in violation of consitutional debt limitation provisions. No further action is anticipated.

HISTORY OF THE SPORTS ARENA

Included in the plan for the central blocks that comprised the "project" considered by the 1973 EIR was a multipurpose 14,500-seat sports arena of approximately 390,000 gross square feet located in the block bounded by Howard, Third, Folsom, and Fourth Streets. With a main interior space eight stories in height, the arena was designed to accommodate movable grandstands and portable seating to accommodate up to 17,500 persons for basketball and 19,500 persons for assembly events. The major revenue producing sports were expected to be ice hockey and basketball. It was intended that the arena would also be used for various shows and entertainment programs, and serve as an adjunct to the convention center.

The hockey team, which at the time of initial planning was expected to use the arena, was later transferred to Oakland, and subsequently to Cleveland. The basketball team expected to use the arena was also transferred to Oakland. These moves resulted in a decrease in expected overall tenancy. The arena was originally scheduled to be financed as a

part of the public facilities in the central blocks. Following litigation initiated in 1972, the sports arena was dropped from further consideration in Yerba Buena Center by the settlement agreement signed in November 1974. Such a facility is not considered in this report.

HISTORY OF THE CONVENTION CENTER

Inclusion of a convention center with exhibit halls and meeting rooms became an intrinsic part of planning for Yerba Buena Center after the redesignation of a redevelopment area in the South-of-Market district in 1961. The Kenzo Tange plan which was the basis for developer bids in 1969 contained a 350,000 square feet underground exhibit hall in the western half of CB-2 and 3, with a 50,000 square foot complex of meeting rooms above. The facility would have extended under Howard Street and would have provided major access from the mid-block pedestrian concourse as well as Howard Street. Public parking was planned to the west of the exhibit hall in above-ground structures on Fourth Street. The parking was placed underground in modifications to the plan made in 1972, and reduced in total to 1,800 spaces. In these plans the convention center was linked to the sports arena, in the eastern half of CB-3, for combined use by large conventions.

Delays in implementation of the convention center and related public and private facilities caused by litigation and cost inflation led to subsequent modifications in the convention center location and configuration and the removal of public parking from CB-3.

MAYOR'S SELECT COMMITTEE, 1976

In March 1976 the Mayor announced the formation of a Select Committee, made up of supporters and opponents of the Redevelopment Plan to formulate a number of different plans for possible development of the Yerba Buena Center area, to obtain public comments and criticism, and finally to submit recommendations for a new plan. Based on staff and committee review and analysis and a series of public meetings, six alternative plans were presented in July 1976 for public review and comments. In August 1976, the Committee published a draft final plan and subsequently reached concensus on a 17-point series of recommendations which were submitted to the Mayor.

The Committee's "preferred plan" included strong preference for an underground convention center on the site which was subsequently selected. It recommended retention of the allocated apparel mart center for that purpose. It recommended retention of St. Patrick's Church and the Jessie Street Substation as historical structures. It recommended development of an urban park, preferably by a private developer. It also recommended that 300 units of subsidized family housing be built within the area and that sites for 400 to 600 units of market-rate housing be set aside north of Howard Street.

Policy affirmation or implementing action has been taken on some of the recommendations. Official consideration of the other recommendations pertaining to features of the plan is expected to follow the official review of the City's EIR. These pertain to the amounts of office space, off-street parking, family housing, market rate housing, and to the entertainment/recreation park.

[1]Board of Supervisors, Resolution 13180, April, 1953.

[2]Board of Supervisors, Resolution No. 17269, November 28, 1956.

[3]Board of Supervisors, Resolution No. 78261, December 15, 1961.

[4]Board of Supervisors, City Ordinance 98-66, April 29, 1966.

[5]Bounded by Market, Third, Folsom, and Fourth Streets.

[6]Later in 1973 the Redevelopment Agency submitted a series of proposed changes to the Redevelopment Plan to HUD. It was the determination of HUD that approval of the changes would constitute a "major federal action" under NEPA and would require a full EIS. Such a document was subsequently prepared (HUD, 1974).

Part VI GENERAL APPROACH TO THE EVALUATION OF ENVIRONMENTAL IMPACT

As noted in Part II and described in Part IV, a specific "project" is being evaluated in this EIS, a project which is comprised of the existing Urban Renewal Plan as amended to date, the principal new developments in the peripheral blocks which were completed or substantially completed by October 1977 and the proposed changes to the Urban Renewal Plan being considered by the Agency as identified in their letter of November 22, 1977 to HUD. Included with the proposed or "designated" changes are several variant or permitted uses which are being evaluated in order to provide the Agency with greater flexibility in meeting the overall objectives of the Urban Renewal Plan. Should one of the variant or "permitted" uses be favored over the currently approved use, its environmental impact will have been evaluated, thus eliminating the need for additional environmental analysis.

Those impact categories, such as air quality, which allow for quantitative evaluation have been examined on the basis of the entire redevelopment area. For example, all sources of air pollutants at full development of Yerba Buena Center are estimated for each pollutant, and total emission at full development is calculated, and the local and regional consequences are reported. When a "permitted" use is analyzed, the change in the areawide impact is discussed; however, tables and graphics for the basic "designated" uses are not redone.

As noted, the quantitative effects at full development of Yerba Buena Center have been estimated. These effects include those of land uses now existing in Yerba Buena Center and scheduled to remain, (such as the new telephone buildings, the community college, etc.), as well as those of land uses committed for development because of binding legal commitments (such as the TODCO housing for the elderly). These land uses are included with the basic "designated" uses. The total effects at full development are of concern because for certain impact categories the cumulative impacts of development must be evaluated, according to NEPA and HUD guidelines. At the same time, for most impact categories it is important to estimate in addition what may be called the "discretionary" impacts, or the impacts of the "permitted" land uses. The latter represent those variant land uses or components which may vary from the "designated" use. These discretionary impacts are presented either in quantitative or in narrative form as clarity and convenience dictates.

The proposed convention center is the component use which has received the greatest individual attention in the impact evaluation. This is because: (a) its planned construction supports the need for an EIS at this time; (b) its concept is well-defined and it has gone through several preliminary designs; and (c) it is proposed to be built over the next 2-1/2 years. Accordingly, its potential impacts have been assessed as of 1981 (along with those of other uses, such as the TODCO housing for the elderly, scheduled for completion by 1980).

However, impacts of full development (including the contributions of the convention center and of other pre-1980 developments) have been analyzed as of 1988. It has been recognized that market considerations might preclude total completion of the entire Yerba Buena Center by 1988. Nevertheless, in the interest of preparing a worst-case impact evaluation for all impact categories, we have treated all social/physical/biological impacts as if the Center were to be completed by 1988.

The proposed recreation/entertainment park (based on the recommendations of the Mayor's Select Committee on Yerba Buena Center) represents an intermediate type of land use. If it were as well-defined at this stage as the convention center, or were expected to be built at the same time, it might require analysis as detailed as that for the convention center. However, the basic concept and the economic feasibility are still being explored. Until it is more firmly defined, it is better to treat it in most impact categories as a general use, with narrative expansion where appropriate. For those impact categories for which quantitative impacts are summed over the entire Yerba Buena Center area, its treatment as a general use creates no error, within the limits of accuracy of the overall treatment.

Finally, impacts have been evaluated at several scales. Certain categories, such as transportation and air quality, have regional as well as local implications. Others, such as financing, are essentially citywide in scale, with some implications at state and federal levels. Still others, such as noise, are primarily local problems. In this context, impacts (in all categories) on current and future residents of Yerba Buena Center have been seen as among the most important issues. This is particularly true for elderly residents.

Part VII PROBABLE ENVIRONMENTAL IMPACTS

As noted in the Preface, the titles and sequence of listing of the various areas of environmental concern are the same - wherever possible - to those listed in the city's Environmental Impact Report. This should facilitate easy comparison between the two documents. Similarly, each assessment is composed of three primary sections: The Environmental Setting; Anticipated or Expected Impacts; and Required and Recommended Mitigating actions.

SETTING

The YBC area is at the southern edge of the downtown Retail District which is characterized by department stores, banks, restaurants, retail shops, hotels, and offices. The Retail District north of Market Street is a center for retail shopping within the Bay Area.

The area to the east of YBC contains offices and retail and downtown support services (wholesaling, printing, office supply sales, building services and restaurants). The YBC area is on the southwestern periphery of the Financial District, which is characterized by modern steel-frame and glass highrise office buildings, as well as older highrise office structures such as the 30-story Pacific Telephone Company tower at 150 New Montgomery Street. Most structures east of YBC are two to ten stories in height and are commonly older, rehabilitated brick or concrete buildings which contain smaller offices, and wholesale and retail establishments. Restaurants which serve daytime office workers are scattered throughout the area. Other downtown support services, such as printing and building maintenance services, are located in this district. Retail establishments which cater to offices, such as retail office supplies and furniture outlets, are also located in this area, particularly along Mission Street.

South of Howard Street and east of Third Street the buildings are mostly older, brick or concrete, and one to ten stories tall. The buildings house light industrial firms, are used as warehouses, or contain retail and wholesale uses. Some are partially occupied. Parking lots located in this area are used by downtown office workers. The area beneath the Bay Bridge and freeway viaducts is used for all-day parking.

The area to the south and southeast of YBC is primarily a light industrial district with some residential and commercial uses. The area is characterized by two-to-five story, brick and concrete, light industrial buildings and warehouses. Parking lots are scattered through the area. Third Street is a major thoroughfare[1] through the district (footnotes are at the end of each subsection in this part). Retail stores front on the street and residential uses are scattered in two- and three-story wood frame structures. There is a residential concentration at South Park, a street south of Bryant Street which was originally laid out to resemble Berkeley Square in London. Retail shops, grocery stores, restaurants, and bars are located at street level in some houses.

PRESENT LAND-USE, SURFACE LAND AREA IN SQUARE FEET, YERBA BUENA CENTER

Block	Land Area	Office	Retail/ Commercial	Retail/ Office	Light Industry	Downtown Support Service	Public & Downtown Support Parking	Temporary Parking	Vacant	Community Service	Vacant Building	Housing
CB-1	281,000			15,000				205,000	22,000	21,000	17,000	
CB-2	454,000							106,000	348,000			
CB-3	454,000							336,000	118,000			
EB-1	34,000	1,000	32,000	1,000								
EB-2	136,000			13,000			13,000	105,000		4,000		
EB-3	301,000	132,000	8,000			24,000	64,000*	68,000	5,000			
SB-1	56,000		4,000		16,000		5,000*	11,000	5,000	9,000		6,000**
SB-2	374,000	131,000			26,000	5,000	14,000*	91,000	107,000			
SB-3	206,000	5,000	30,000		33,000		10,000*	48,000	81,000			
SB-4	64,000				29,000			12,000	23,000			
WB-1	12,000		2,000							10,000		
WB-2	75,000			6,000		10,000	21,000	24,000	3,000		11,000	
WB-3	148,000	8,000	15,000					21,000	11,000 and 16,000 garden	10,000	4,000	64,000***
TOTAL+	2,595,000	276,000	91,000	36,000	103,000	40,000	34,000	1,027,000	723,000 and 16,000 garden	55,000	32,000	70,000

Principal Streets--874,000 plus Side Streets--290,000 = 1,164,000. TOTAL YERBA BUENA CENTER AREA: 1,164,000 plus 2,595,000 = 3,759,000

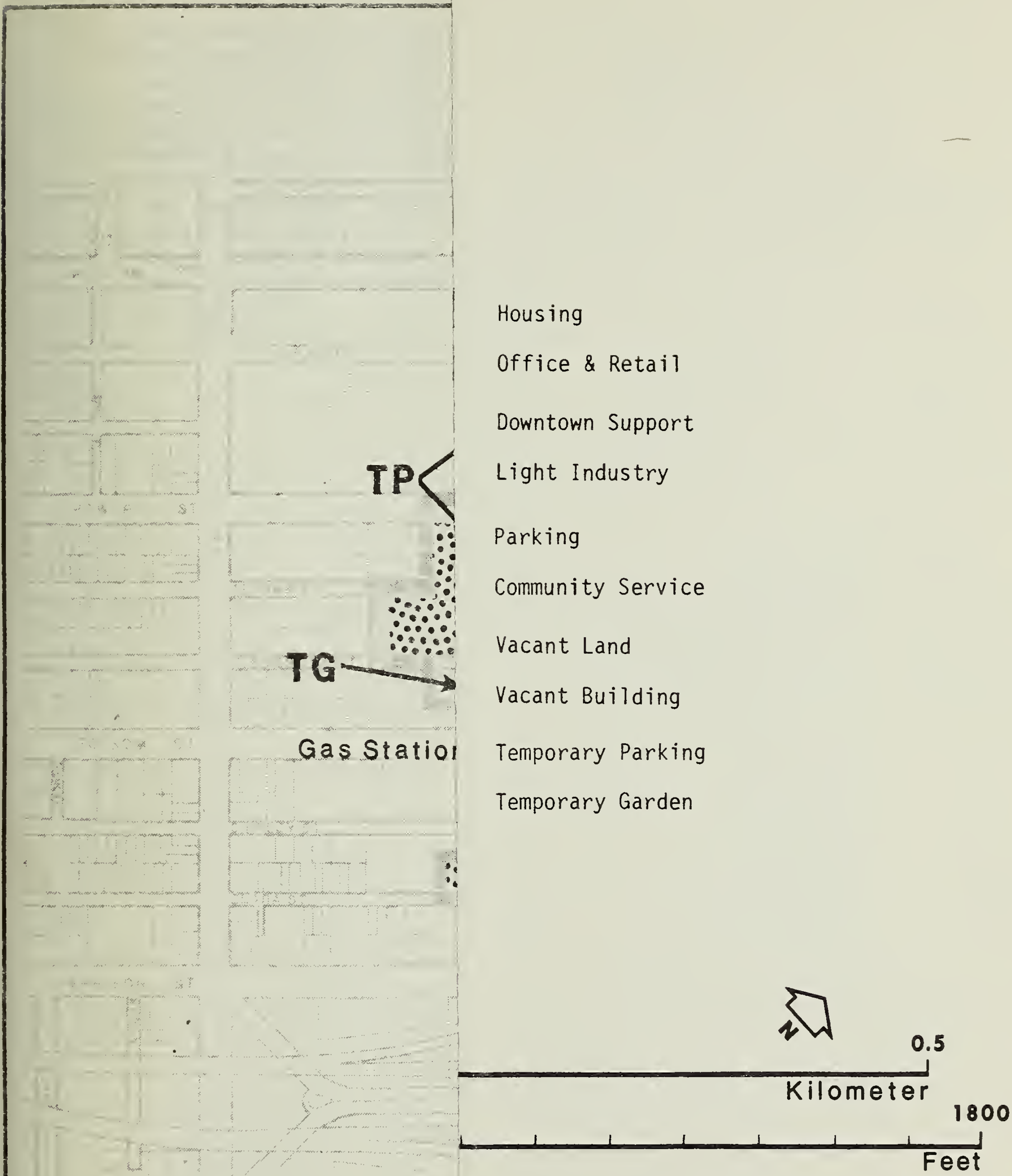
*Downtown Support Parking (private)
**Portion of the Silvercrest Residence in Yerba Buena Center
***276 D.U.'s
+May not add due to rounding of all entries to the nearest 1,000 sq. ft.

The area west of YBC is similar to the area to the south, i.e., primarily light industrial, with some downtown support services, retail and residential uses. The structures are mainly low- to medium-rise brick or concrete buildings. The principal streets, notably Mission Street and Sixth Street, have some retail businesses. Residential buildings are mixed with the other structures. Housing complexes built within the past five years, such as the Alexis Apartments and the Silvercrest Residence, are found in this area. The Filipino Education Center is located on the site of the former Lincoln Elementary School on Harrison Street adjacent to YBC. Sixth Street is lined with two-to-ten story brick or concrete buildings, including hotels which serve low-income residents. The street level floors are generally used for retail purposes such as bars, pawn shops, diners, grocery and liquor stores, and used-merchandise stores. Several soup kitchens and other service centers are maintained by philanthropic organizations.

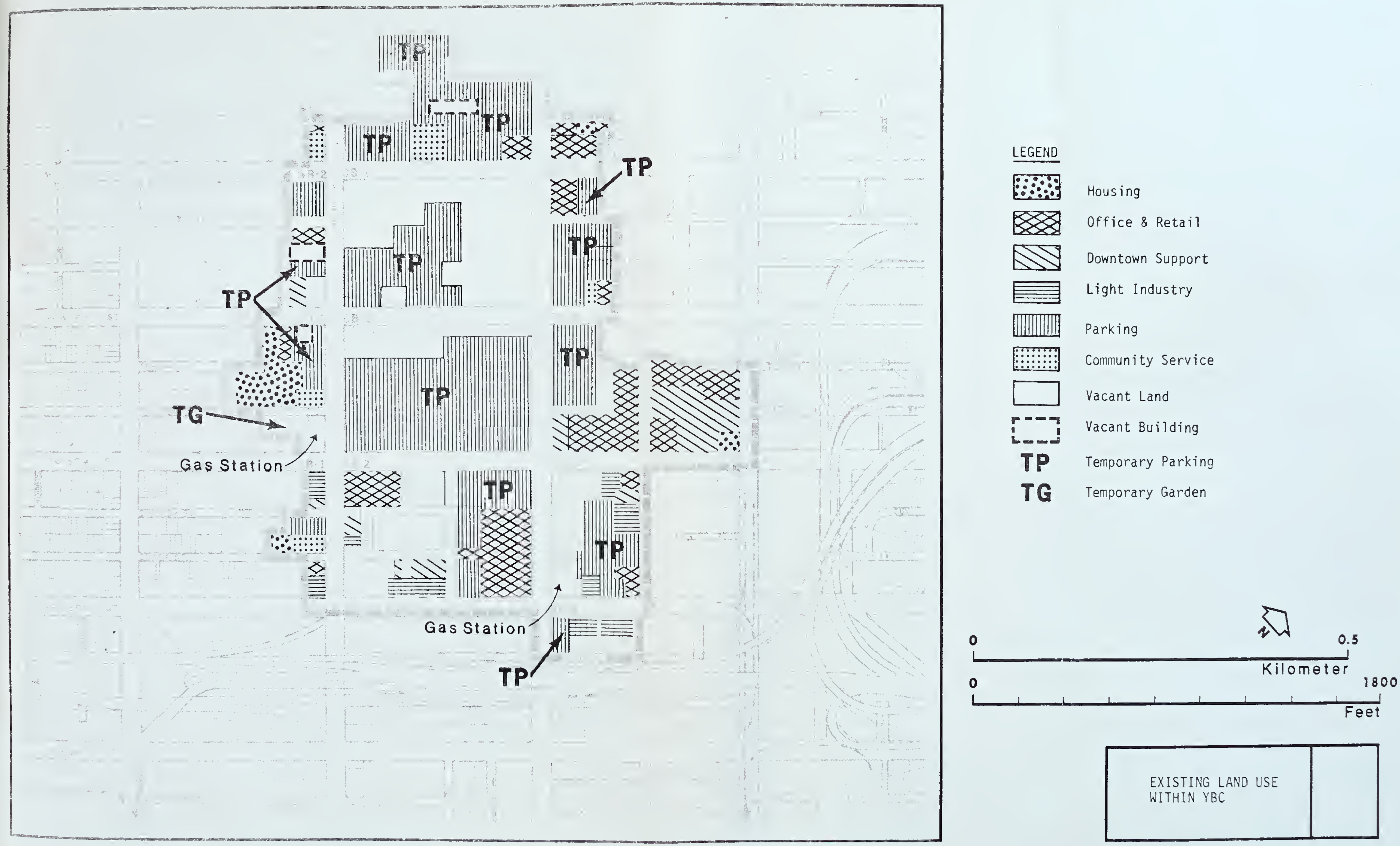
OVERVIEW OF LAND USE IN YERBA BUENA CENTER

Mixed land uses presently characterize the YBC area (see Figure following). The total YBC land area, excluding the area devoted to streets, is 2,600,000 sq. ft., or almost 60 acres. Area land use is shown by category and block in the Table opposite. The largest single use is the 1,000,000 sq. ft. of open space in and around the central blocks, which is now used for temporary parking lots. Unused vacant lots comprise an additional 700,000 sq. ft. of undeveloped land.

The YBC area is presently in a state of flux with concurrent construction, demolition, rehabilitation and planning of structures under way. Structures which occupied 1,800,000 sq. ft. of land surface area have been cleared since 1969, and their sites are available for new construction. Twelve existing buildings, which occupy a combined surface area of 67,000 sq. ft., are intended to be razed. As of September 1977, the Redevelopment Agency has a demolition contract out for bid on one of these buildings, the Agency's former site office on Howard Street. The remaining 11 structures, including the Imperial Hotel on Fourth Street and the Planter's Hotel at Second and Folsom Streets, will probably be demolished.[2] New office buildings with 1,380,000 sq. ft. of office space have been constructed on 241,000 sq. ft. of surface area since 1969 in the eastern and southern blocks of YBC. Other new structures include the Downtown Center of the San Francisco Community College, which occupies 9,800 sq ft. of surface area and a 22,500 sq. ft. service station on cleared land at Third and Harrison Streets. Subsidized housing, the Clementina Towers (276 dwelling units) and a portion of the eastern tower of the Silvercrest Residence (about 70 dwelling units) occupy a total of 70,100 sq. ft. Private parking occupies 47,600 sq. ft. of cleared land, and the eastern end of the block-long Fifth and Mission public parking structure with 280 stalls occupies 21,000 sq. ft. (most of the structure is west of YBC).



EXISTING LAND USE
WITHIN YBC



EXISTING LAND USE
WITHIN YBC

The remaining YBC surface area is occupied by existing structures which are intended to be retained under owner participation agreements with the Redevelopment Agency. (Owner participation agreements are agreements between the Redevelopment Agency and property owners under which properties will be retained by present owners and brought into conformity with Redevelopment Agency design and use standards.) Some of the structures have been renovated while others, such as the Mercantile Building and the Jessie Street Substation, would require considerable remodeling for retail and office use. There are 42 buildings which would be retained; these occupy a combined area of 331,000 sq. ft. Floor areas of present uses, by block and category, appear in the following Table and by parcel in Appendix C.

PRESENT SPACE USE, FLOOR AREA IN SQUARE FEET, YERBA BUENA CENTER

Block	Number of Bldgs.	Land Area	Office	Retail/ Commercial	Retail/ Office	Light Industry	Downtown Support Service	Public & Downtown Support Parking	Temporary Parking	Vacant	Community Service	Vacant Building	Housing
CB-1	3	281,000			91,000				205,000*	22,000	21,000*	25,000	
CB-2	-	454,000							106,000*e	348,000*[e]			
CB-3	-	454,000							336,000*	118,000*[e]			
EB-1	7	34,000	7,000		3,000 and 100,000[d]								
EB-2	6	136,000			21,000 and 48,000[d]			13,000*	79,000*		4,000*		
EB-3	8	301,000	833,000	8,000*[d]			60,000	103,000** and 17,000*/**	68,000*	5,000*			
SB-1	5	56,000		10,000		25,000		5,000*/**	11,000*	5,000*	18,000		6,000*
SB-2	10	374,000	568,000			34,000	11,000	14,000*/**	91,000*	107,000*			
SB-3	7	206,000	12,000	35,000		49,000		10,000*/**	48,000	81,000*			
SB-4	7	64,000				35,000			12,000*	23,000*			
WB-1	2	12,000		6,000							86,000		
WB-2	4	75,000			6,000*[d]		28,000	101,000[e]	24,000*	2,000*		11,000*[d]	
WB-3	5	148,000	16,000	15,000					21,000*	11,000* and 16,000* garden	33,000	7,000*[e]	64,000*
TOTAL***	64	2,595,000	1,435,000	66,000 and 8,000*[d]	115,000 148,000, and 6,000*[d]	143,000	99,000	101,000, 13,000* 103,000**, and 45,000*/**	1,027,000	723,000* and 16,000* garden	137,000 and 26,000*	25,000 7,000[d] and 11,000*[d]	70,000*

*Land Surface Area Only
**Downtown Support Parking
***May not add due to rounding of all entries to the nearest 1,000 sq. ft.
e = Estimated
d = To be demolished

LAND USE BY BLOCKS IN YERBA BUENA CENTER

The floor areas or surface areas of existing buildings and uses in the YBC area are shown, by block, parcel category, and expected use, in Appendix Table C. (Unless otherwise noted, all references in this report are to portions of each block within the YBC boundary; only CB-2, CB-3, and SB-2 are entirely within YBC).

The central YBC blocks, CB-1, CB-2, and CB-3, are mainly cleared land at present. CB-1 is mostly open space used for temporary parking (446 spaces). An area excavated below street level at the northeast corner of Mission and Fourth Streets is used for temporary parking by construction workers. Three buildings of historical and architectural value are in the block: St. Patrick's Church on Mission Street, the Jessie Street Substation, and the Mercantile Building at the northwest corner of Third and Mission Streets.

CB-2 and -3 form a central open expanse; more than half of CB-2 contains pits formed by the former basements of demolished buildings. A number of foundation walls remain standing below street level, particularly under the sidewalks along Mission Street; these cave-like shelters occasionally have been inhabited by squatters. Three such under-sidewalk shelters were inhabited in July 1977 in CB-2;[3] two other inhabited shelters were observed in other vacant blocks. Some shelters appear to be used only occasionally. The remaining street level area of CB-2 (205,000 sq. ft.) is used for temporary parking (302 spaces) by downtown workers. CB-3 uses are similar to those of CB-2: about eight acres consist of cleared land with temporary parking (959 spaces) and about two and one-half acres are fenced, cleared, vacant land.

The eastern YBC blocks, EB-1, -2, and -3, have a variety of uses, old and new buildings, and vacant land. All the original structures are standing in EB-1. The land area is 34,000 sq. ft., of which 93% would probably be made available for new construction following demolition of the existing buildings. The five buildings which will probably be demolished have a combined floor space of 100,000 sq. ft. Retail shops and bars are located on the ground floors of these two- to five-story buildings. The upper floors are mostly vacant. Two of the buildings presently in greater use are the Jessie Hotel and Breen's Bar building. Breen's Bar is a bar and diner for local office workers; the second floor of the building is now partially used for office space.

Most of EB-2 has been or probably will be cleared. Two buildings will be retained under owner-participation agreements: the 4,400 sq. ft. Station 35 firehouse and a 21,000 sq. ft. renovated retail store (7,300 sq. ft. of land area). There are currently 304 temporary parking spaces.

EB-3 contains areas of cleared land, temporary parking (192 spaces), and new office buildings. Three office buildings have been developed along Hawthorne Street under agreements with the Redevelopment Agency: the 11-story Pacific Telephone building with 616,000 sq. ft. of floor space, the United California Bank office building with 104,000 sq. ft. of floor space, and the Arcon General Electric building with 93,000 sq. ft. of floor space and 35,000 sq. ft. of private parking underground (260 spaces). The southern YBC blocks, SB-1, -2, -3, and -4 are characterized by mixed uses, new construction, and cleared land which is vacant or used for temporary parking (437 spaces).

The western blocks contain a mixture of vacant parcels, vacant buildings intended to be demolished, community services, and subsidized housing (Clementina Towers and Silvercrest Residence).

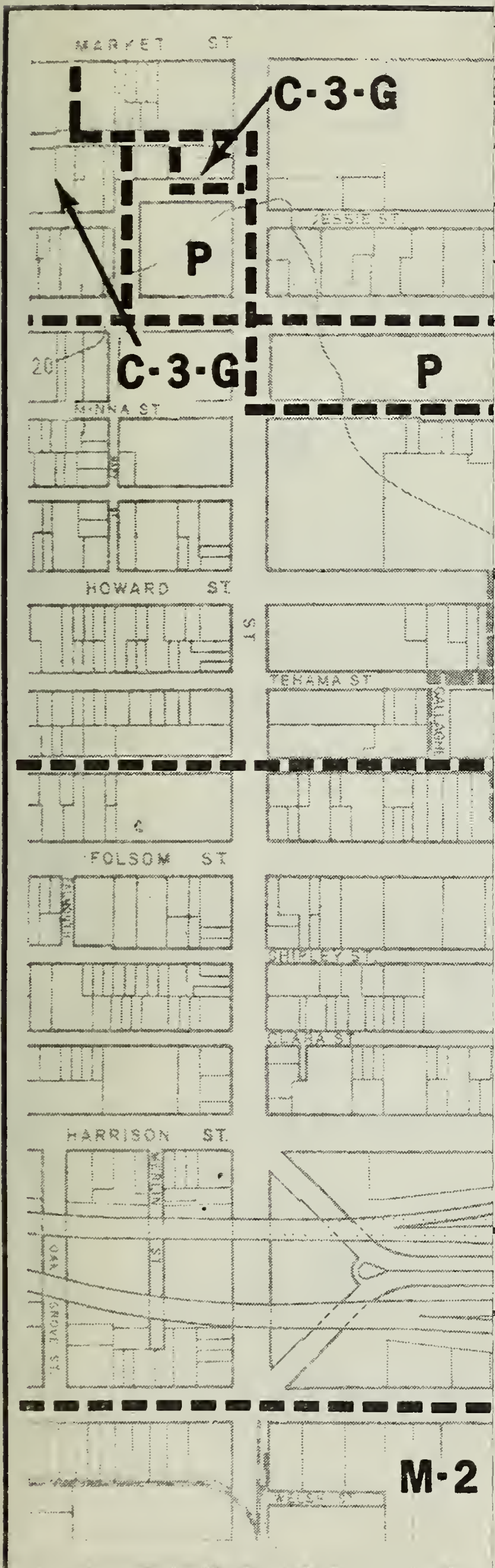
The remainder of the YBC area is in use as public streets. Of this, 874,000 sq. ft. is occupied by the grid of 82.5-foot-wide streets (width includes sidewalks), such as the north-south Second, Third, and Fourth Streets. Other side streets vary in width from 30 to 50 feet, and occupy a combined surface area of 290,000 sq. ft. The total combined surface area of all paved YBC principal and side streets is 1,160,000 sq. ft.

The City Planning Code land use (zoning) districts, the Planning Code Height and Bulk Districts, and the Land Use Plan of the adopted Redevelopment Plan are shown in the following three figures. Among the principal uses permitted in CB-1 and WB-1 are retail businesses, personal service establishments, and business and professional offices. The allowable floor area ratios (10:1) and allowable building heights (400 feet) are the same under the Planning Code and the Redevelopment Plan.

CB-2 and -3, part of EB-2, all of EB-3, part of WB-3, and WB-2 are designated for downtown support use (Land Use District C) in the Redevelopment Plan and are zoned C-3-S, with a height limit of 340 feet and floor area ratio of 7:1. Both designations permit a variety of downtown support functions such as wholesaling, printing, building services and parking.

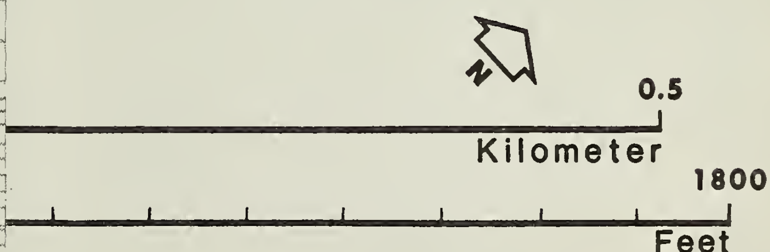
The central blocks are also in a "special use" category in the Redevelopment Plan, which permits such uses as an exhibit hall, sports arena, hotel for transient guests, and radio and television studios.

EB-1 and part of EB-2 are designated for downtown office use (Land Use District A) in the Redevelopment Plan and are zoned for downtown office use, C-3-O, in the Planning Code with a height limit of 500 feet. Office development and related retail and service uses are the principal permitted uses in both designations.

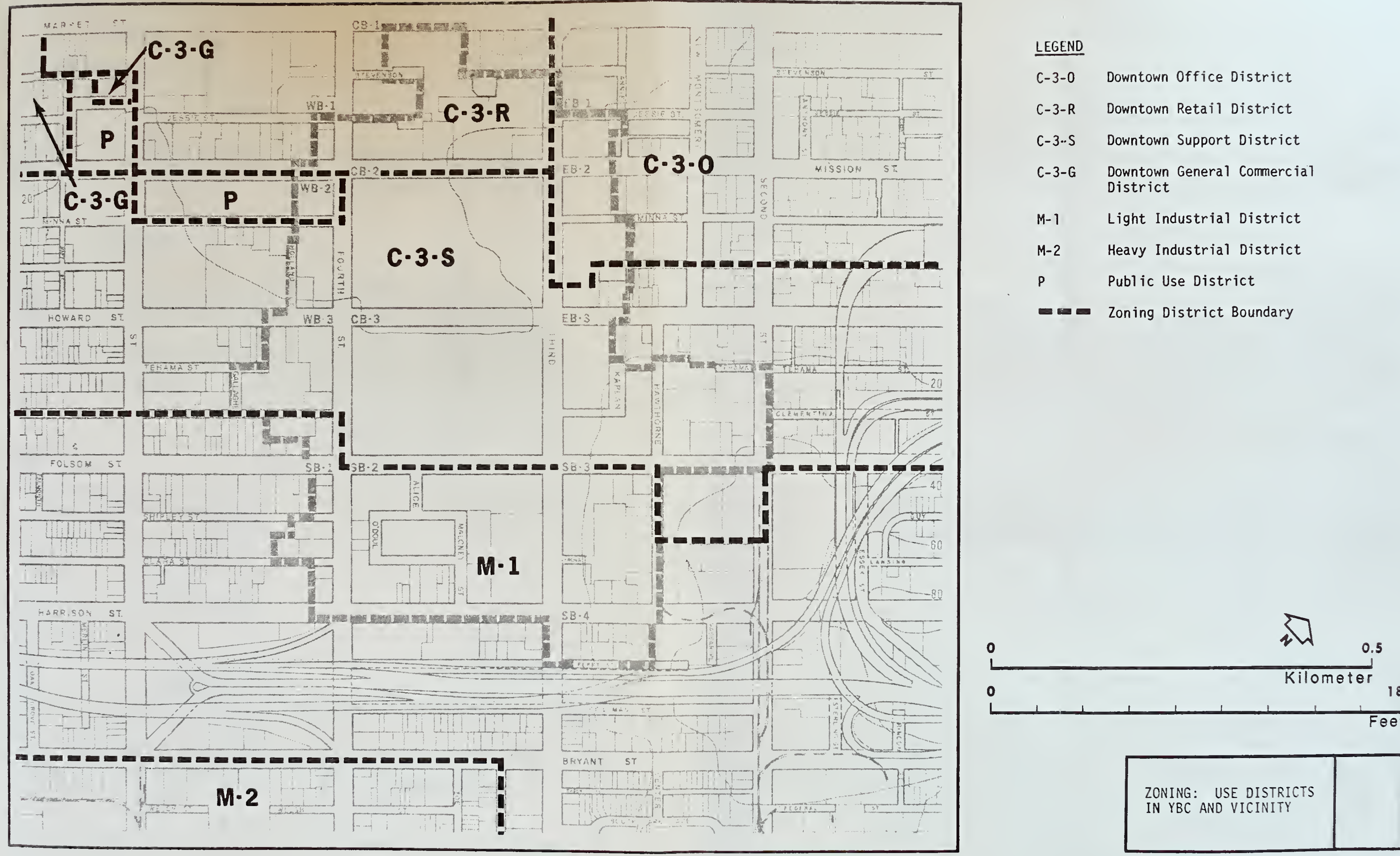


END

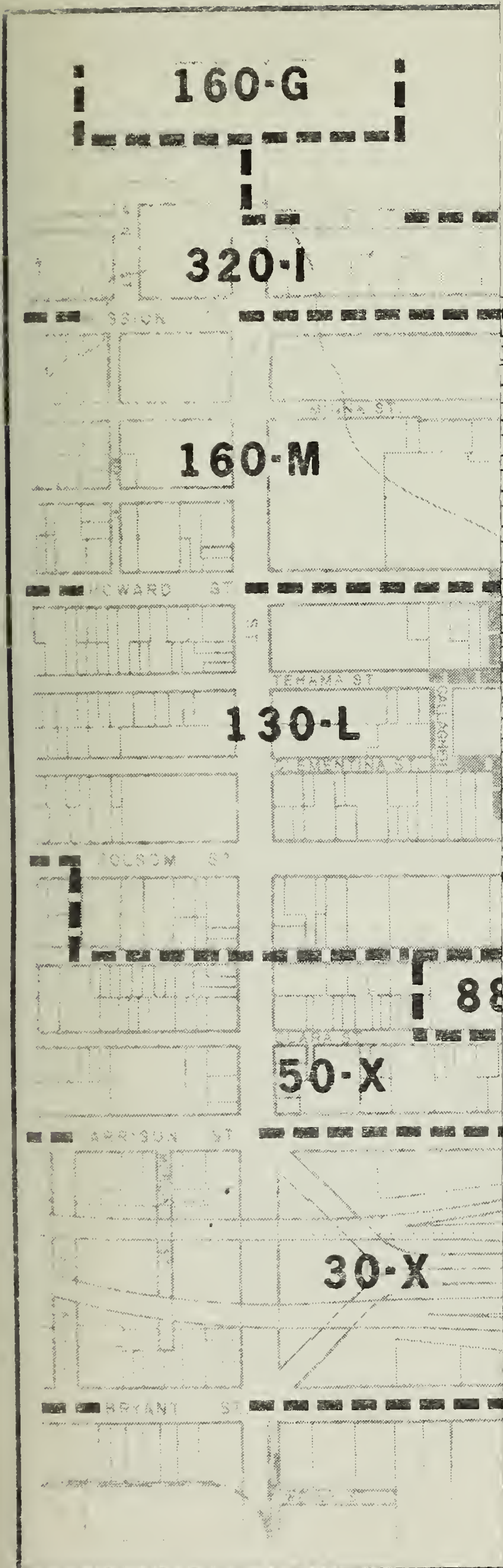
-O	Downtown Office District
-R	Downtown Retail District
-S	Downtown Support District
-G	Downtown General Commercial District
	Light Industrial District
	Heavy Industrial District
	Public Use District
	Zoning District Boundary



ZONING: USE DISTRICTS
IN YBC AND VICINITY



ZONING: USE DISTRICTS IN YBC AND VICINITY



t ulk icts	Height Limit	Height above which Maximum Dimensions apply	Maximum Building Length	Maximum Diagonal Dimension
-I	700	150'	170'	200'
-I	500	150'	170'	200'
-I	400	150'	170'	200'
-I	340	150'	170'	200'
-I	320	150'	170'	200'
-G	160	80'	170'	200'
-M	160	100'	250'	300'
-G	130	80'	170'	200'
K	88	60'	250'	300'
K	80	60'	250'	300'
-L	130	80'	250'	300'
X	50	Bulk limits not applicable		
X	40	Bulk limits not applicable		
X	30	Bulk limits not applicable		

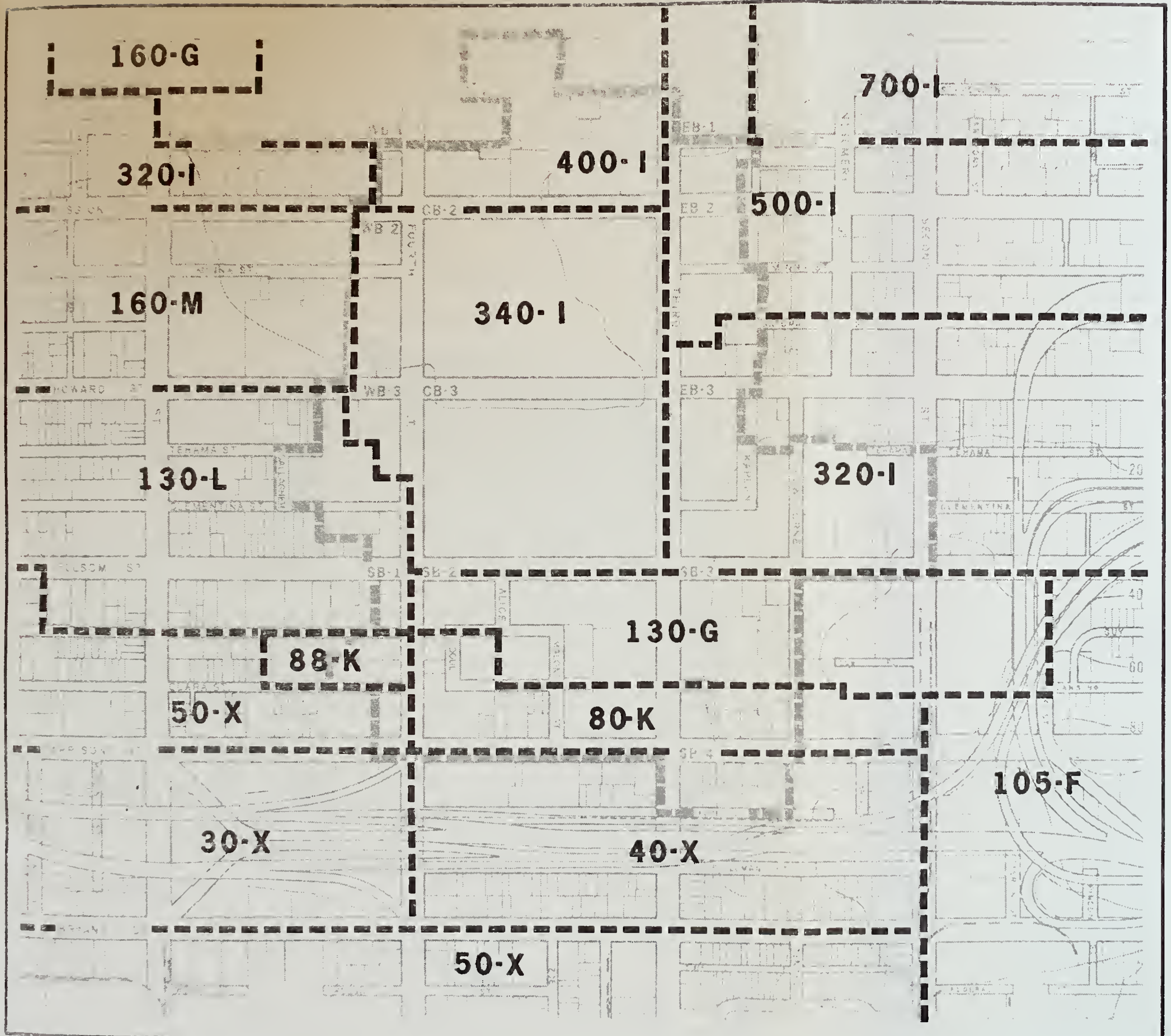
Height and Bulk District boundary

N

0.5 Kilometer

1800 Feet

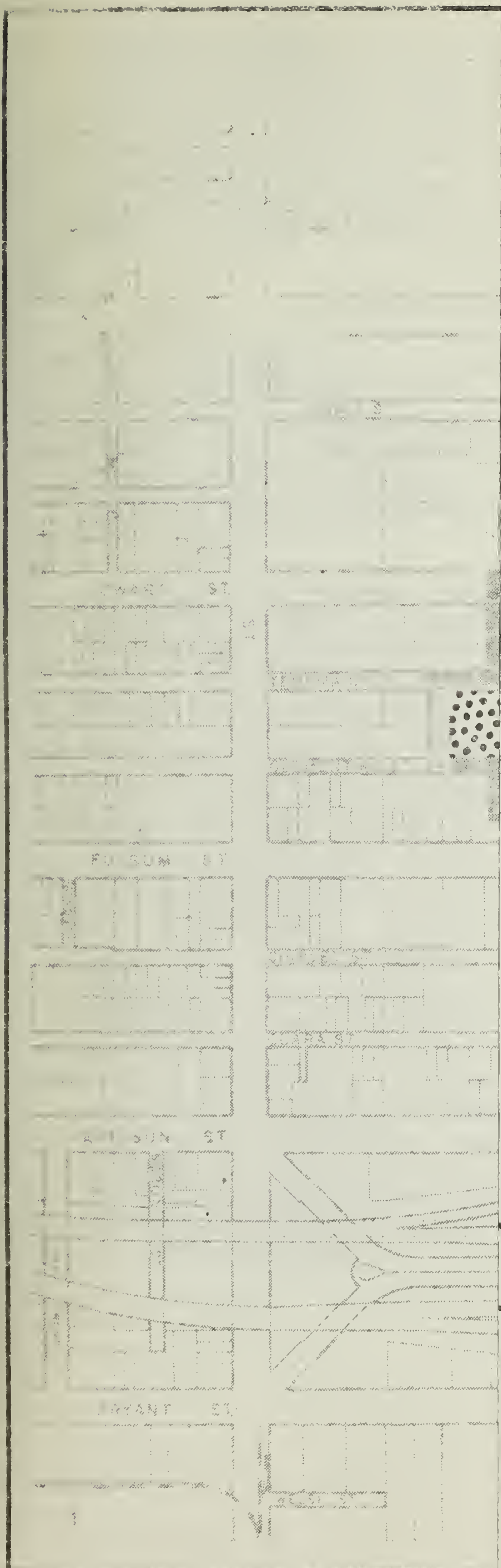
ZONING: HEIGHT & BULK DISTRICTS IN YBC AND VICINITY



Height and Bulk Districts	Height Limit	Height above which Maximum Dimensions apply	Maximum Building Length	Maximum Diagonal Dimension
700-I	700	150'	170'	200'
500-I	500	150'	170'	200'
400-I	400	150'	170'	200'
340-I	340	150'	170'	200'
320-I	320	150'	170'	200'
160-G	160	80'	170'	200'
160-M	160	100'	250'	300'
130-G	130	80'	170'	200'
88-K	88	60'	250'	300'
80-K	80	60'	250'	300'
130-L	130	80'	250'	300'
50-X	50	Bulk limits not applicable		
40-X	40	Bulk limits not applicable		
30-X	30	Bulk limits not applicable		

Height and Bulk District boundary

ZONING: HEIGHT & BULK DISTRICTS IN YBC AND VICINITY



Housing

Office & Retail

Downtown Support

Light Industry

Parking

City Owned

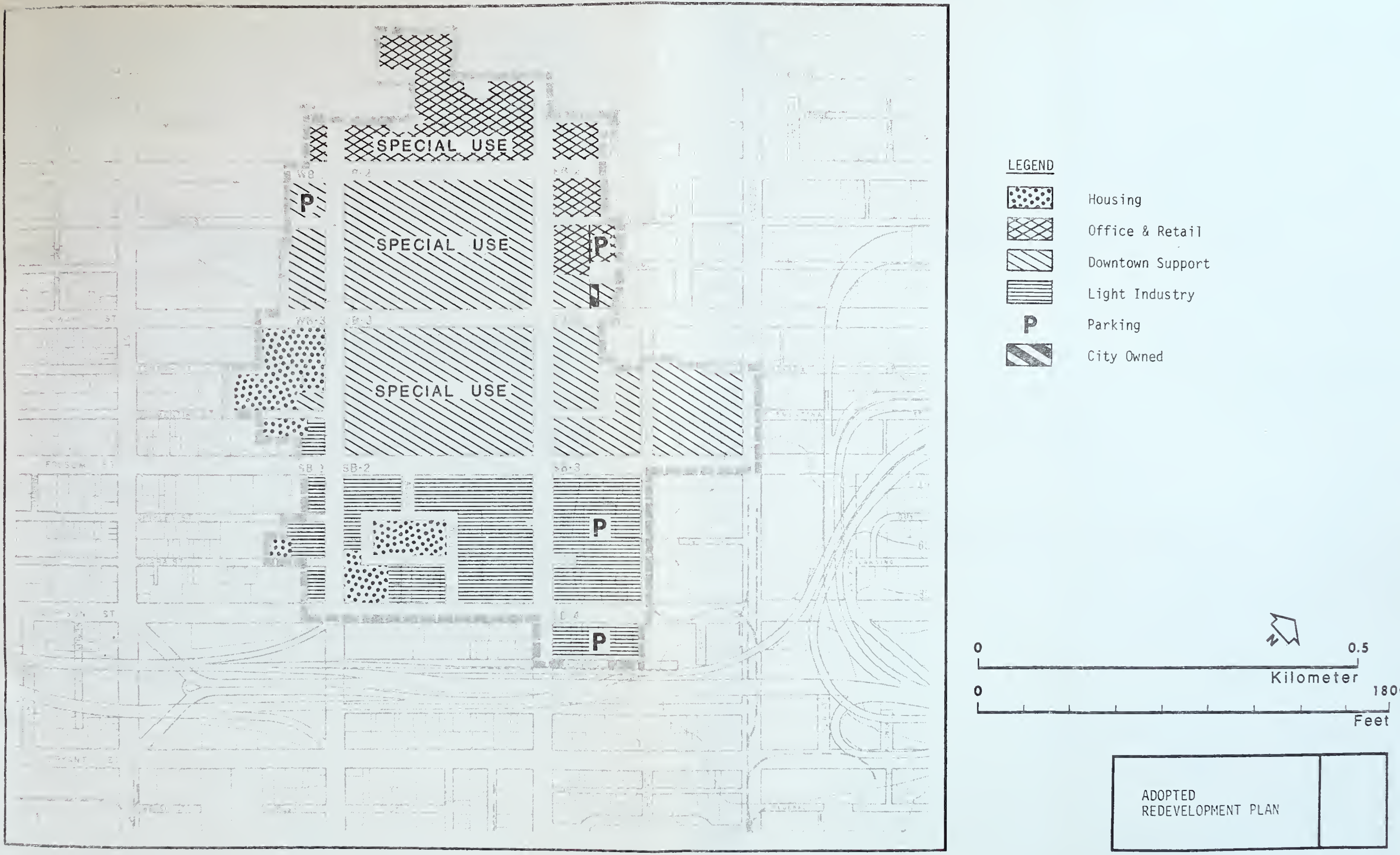
0.5

Kilometer

1800

Feet

ADOPTED
REDEVELOPMENT PLAN


SPECIAL USE
SPECIAL USE
SPECIAL USE
P
P
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LEGEND
Housing
Office & Retail
Downtown Support
Light Industry
P
Parking
City Owned
0
0.5
Kilometer
0
1800
Feet
ADOPTED
REDEVELOPMENT PLAN

Southern Blocks 1, 2, 3, and 4 are shown in the Redevelopment Plan as business service and light industry (Land Use District E), consistent with the M-1 (Light Industrial) zoning for these blocks. Parking is shown as a permitted use in SB-3 and -4. Housing may be developed in an M-1 district as a Planned Unit Development upon authorization by the City Planning Commission.[4] The figure on page IV-7, shows the five sites designated which may be selected to include housing as a "permitted" use.

VISUAL SETTING OF YERBA BUENA CENTER

The topography in the YBC area is nearly flat and slopes gently toward the south-southwest. A slight rise occurs in the northern portion of the area; the steepest slope is in the southeastern portion east of Third Street. The current visual character of Yerba Buena Center is dominated by the open space in the central blocks and the cleared lots in the adjacent peripheral blocks with the Clementina Towers appearing in the distance.

Looking at the central blocks, the views are of temporary parking lots, fenced-in vacant lots, and pits filled with rubble and crumbling foundation walls of the basements of the demolished buildings formerly on the site. The lots are dusty, overgrown with weeds, and scattered with broken bottles and other trash. The openness of the central blocks provides views of the downtown highrise buildings in the Retail and Financial Districts and of the hotels on Nob Hill. The view toward the north from the central blocks is especially varied, with the foreground dominated by the red brick facade of St. Patrick's Church, and the red brick facade of the Jessie Street Substation. The cream-colored, brick facade of the Mercantile Building also stands out in isolation from other buildings in the area. The larger buildings near and along Market Street form a backdrop behind these structres. Modern highrise buildings, such as the Bank of America headquarters and the Transamerica pyramid, rise behind older structures; their angular lines contrast with the more intricate lines of the older buildings. The former Southern Police Station now used as a Salvation Army recreation center, is of interest as a historic structure (See section on Historic Preservation). The view to the northeast is dominated by the highrise office buildings of the Financial District. The view to the east and southeast is similarly dominated by the office buildings of the Pacific Telephone Company, including its 30-story building on New Montgomery Street at the edge of YBC, and the newer offices along Hawthorne and Second Streets near the top of Rincon Hill.

The view toward the south is dominated by the new Pacific Telephone Building at Third and Harrison Streets and the ochre-colored American Telephone and Telegraph office building at Fourth and Folsom Streets. The view further south is mostly blocked by the viaducts of the James Lick Freeway and the Bay Bridge approaches. The view to the west from the central blocks is dominated by the towers of the Silvercrest Residence, Clementina Towers, and Alexis Apartments, and by the steel and glass facades of the Crocker Bank Service Center Building at Fifth and Howard Streets. The brick facade of the vacant Imperial Hotel on Fourth Street contrasts with the modern or refurbished facades of other buildings which face on the central blocks, such as the steel-and-glass-faced Community College Downtown Center and the brightly painted Victorian Hotel.

A special visual point of interest is the planned entrance to YBC from Market Street. The view to the south at that point is restricted by a temporary wooden wall constructed by the Redevelopment Agency. The Market Street sidewalk has been paved with red bricks and landscaped with trees, and a bus-stop shelter has been constructed at the site. The sidewalk is busy with shoppers and office workers in the daytime, and the street is crowded with transit and vehicular traffic. In contrast, the area is almost deserted at night. The view in either direction up Market Street is dominated by large buildings: to the east, the highrise offices of the Financial District and to the west, the older buildings of the Retail District.

From the intersection of Grant Avenue and O'Farrell Street at Market Street, there is a view of the older retail buildings along Grant Avenue framed by the two bank buildings of a neo-classical architectural style on either side of the street. Grant Avenue is lined with trees up to the entrance gate to Chinatown. Behind the wooden YBC fence, the view to the south is of a foreground which is filled with parked automobiles in the daytime and which is an empty paved lot at night. The Jessie Street Substation is plain when viewed from this point, for its decorative facade cannot be seen. Similarly, the rear of St. Patrick's Church appears to be an unfinished structure because it lacks the red brick covering over the reinforced concrete which the facade possesses.

The openness of the central blocks is less impressive when seen from outside points like the Bay Bridge approach, for the whole area has a foreshortened appearance. From highrise buildings north of Market Street, especially those closest to the site, the dominant element is the openness of the central blocks. The large scale of the open central blocks is most apparent from these vantage points, for they are seen within the context of the surrounding fully-developed districts.

Impacts

Land Use

Development according to the existing Urban Renewal Plan, with or without one or more of the "permitted" variants from the designated uses would turn the Yerba Buena Center Area into an activity center of citywide and regional importance. The principal feature would be the Convention Center in CB-3 serving a regional, national and international clientele. Other features would include over seven million square feet of office space; a hotel serving, in part, users of the Convention Center; commercial entertainment; an apparel mart including fifty market rate housing units on the roof; and public open spaces which could include a passive park on the roof of the convention center. Public parking would be provided at two sites: in the office complex east of Third Street at Minna Street, and in SB-3 with primary access from Hawthorne Street. These uses would mark Yerba Buena Center as an expanded part of downtown San Francisco, a center of convention activity, and the southwestern edge of an expanded Financial District. New housing, built in compliance with a settlement agreement resulting from litigation, would be located in the western and southern blocks. This housing would extend and emphasize a type of residential use which existed before redevelopment was begun in the area but which, because it was more scattered, was not so evident. The remaining parcels would be filled with light industrial uses.

Services for elderly residents in and near YBC are not as convient as desired, especially with respect to food stores, laundromats, and similar types of personal goods and service outlets. Adding the 600 (committed) elderly dwelling units and 50 market dwelling units, would help create a central city residential/commercial/light industrial area. The area would not be suitable for many who desire suburban/residential shopping center type neighborhoods, but is desireable for those who seek the inner city and the mix of land uses. For these families, and elderly inner city residents, the YBC Project and its adjacent areas provide an environment of activity, interest and urban dynamism. The adding of the 600 additional elderly (committed), 50 market and up to 900 more "permitted uses" for family and individual residential units will serve to stimulate small entrepeneurs to provide neighborhood type services.

Selection of Permited Uses

Selection of the "permitted" recreation/entertainment park over the top of the Convention Center and, possibly, on the western two-thirds of CB-2 could make YBC a unique activity center.

Selection of all of the five "permissible" housing sites would increase the number of housing units by up to 900 in addition to the 600 units committed by the legal settlement and the fifty located on top of the apparel mart. This intensification and diversification of housing would tend to attract resident-serving commercial services. Industrial uses would be reduced by about two-thirds.

Selection of the public parking garage as a permitted use on the northwest corner of EB-3 would provide some 1200 public parking spaces across Third Street from the convention center and the recreation/entertainment park thus concentrating parking on the eastern side of YBC - away from the primary housing area. The 1,800 space underground parking garage has been eliminated.

ZONING

Except for the areas designated for housing, the development of YBC would result in the creation and rehabilitation of structures and uses which would be allowed as principal uses under the City's zoning regulations and which would be consistent with the official Redevelopment Plan. Housing is permitted as a conditional use in the C-3-O, C-3-R, and C-3-S districts upon authorization by the City Planning Commission, and may be developed in an M-1 district in a redevelopment area as a Planned Unit Development (P.U.D.) upon authorization by the City Planning Commission. A P.U.D. is a form of conditional use based upon an overall site plan (arrangement or use) under regulations or requirements differing from those ordinarily applicable under the Planning Code. An amendment of the redevelopment plan would be required for housing on any sites not presently designated for housing. This would include all of the "permitted" sites noted in the November 22, 1977 letter (See Appendix I). The central blocks would comply with the use and other provisions of the City Planning Code. The 50 dwelling units would require conditional use authorization by the City Planning Commission, however, in order to comply with the Planning Code.

EB-1, -2 and -3 would contain retail and office uses and, if selected as a "permitted use," a public parking garage. The garage would require review and conditional use authorization by the City Planning Commission. Retail and office uses would comply with pertinent provisions of the Planning Code.

VISUAL IMPACTS

Full development would result in a most extensive addition to the downtown highrise skyline when seen from a distance, and would provide micro-scaled views of both new and historic buildings and of landscaped walkways and plazas when seen from within at the pedestrian levels. The allocation of 1% of construction costs to the provision of art and embellishment, which is required by the Redevelopment Agency and by the City Charter for public buildings, and for private buildings by the Redevelopment Agency agreements, would be evident at various locations throughout YBC.

The visual character of CB-3, SB-2 and WB-3 would be among the first to be altered. With the completion of the underground convention center, a park is the designated use planned for the surface level -replacing the temporary parking areas which exist in the blocks at the present time. Although the convention center would be underground, its top would be 12-16 feet above Howard Street and 21-30 feet above Folsom Street. Like the Union Square garage, it would create a mounded effect when compared with the topography existing prior to construction. An eight-story housing development would be completed at Shipley Street, between Maloney Street and O'Doul Lane in SB-2, and a nine-story housing development would replace the temporary parking area at the southwest corner of Howard and Fourth Streets in WB-3.

The initial development of a park on the surface level of the convention center would provide a permanent open space contrasting with the urban development surrounding it. The park would comply with policies of the Urban Design Element of the Comprehensive Plan which call for providing large-scale landscaping,[5] and of the Recreation and Open Space Element which call for acquiring new park space and giving priority for improvements in high-need neighborhoods.[6]

With full development of the area, the visual appearance and the aesthetic experience of entering and viewing YBC from all points would be changed. The impact of the development would be magnified due to the location of YBC along entrance routes to the City from points east and south. In general, the visual effect would be consistent with pertinent policies of the Urban Design Element of the Comprehensive Plan. The visual pattern of existing principal streets would be reinforced,[7] as medium- and high-rise edges would be along most of the block faces of the grid of principal streets. Architectural landmarks would be apparent in the pedestrian concourse and on Mission and Fourth Streets.[8] The height and bulk of new buildings[9] would be related to the scale, form and proportion of older development nearby,[10] to the height and character of existing development,[11] and to the prevailing scale of development.[12] The quality of the total visual image would be dependent upon the architectural and design review procedures and standards to be applied by the Redevelopment Agency,[13] upon the form, bulk, materials and colors of buildings which have not yet been designed, and upon the inter-relationships of such buildings.

As of now, YBC as a whole does not have a coherent, unified and harmonious urban design pattern. For purposes of this analysis it is assumed that by the time significant detailed planning begins, the urban design consultant (Skidmore, Owings & Merrill) engaged by the Redevelopment Agency would have developed specific standards and procedures which would assure compliance with policies of the Urban Design Element of the Comprehensive Plan and attainment of accepted urban design objectives in accordance with the Agency's intent. Some possibilities are discussed in the following paragraphs.

On the east side of the park, on Third Street, office buildings would visually define the edge of the park. Continuing to the north, office buildings and towers, rising from 32 to 46 stories, in EB-2 and -1, would visually identify what would be the new western edge of the South-of-Market portion of the Financial District.

West of the park, above the convention center, the Fourth Street edge would be marked by the two Clementina Towers and the three medium-rise TODCO apartment buildings housing elderly residents on either side. This would be an open edge, providing views through it from the park to the hills of Twin Peaks and Diamond Heights to the west and southwest.

On the south side of the park, an industrial building or buildings up to five stories in height, in conjunction with the American Telephone Building, would block views of the area from the south. Views of the park from the lower floors of the housing units at Peter Maloney and Shipley Streets would also be completely cut off.

"Permitted Uses"

The additional housing being considered as "permitted" uses on five sites would reduce the height and bulk around the central blocks. In SB-2, the industrial uses along the south side of Folsom Street would be replaced. Depending upon the design and layout, this housing could result in the retention or obstruction of views of the park from the housing in the center of the block at Shipley and Maloney Streets.

In SB-3, east of Third Street, housing would replace the designated industrial and parking uses. If designed with highrise elements, this housing could capture the topographic advantage given the site by its positioning at the edge of Rincon Hill and provide dwelling units with views eastward to the Bay and Bay Bridge as well as westward over the convention center roof park (or recreation/entertainment park) area. Selection of the "permitted" recreation/entertainment park as opposed to the designated passive park for the roof of the convention center would make it a visually dominant entity from within YBC for it could occupy up to 18 acres in the central blocks.

Consisting of various types of open space for active and passive use, of one-, two- and three-story structures for restaurants, markets, retail outlets, theaters, and museums, and of symbolic architectural expressions, the recreation/entertainment park would make a visual statement not only of its own functions but of YBC as a whole. The recreation/entertainment park, if also located on the western two-thirds of CB-2, would be bordered to some extent by housing -- market-rate and subsidized --on the northern, western, and southern sides, and could provide an outlook of open space and varied activities for the residents. The park would be a center of continuous nighttime (evening) and weekend activity, especially during the peak period of summertime visitation.

Selection of the "permitted" 1,250-space parking structure for the northwest corner of EB-3, east of the convention center, could add an intrusive visual element.

Mitigation

In the absence of any negative or adverse impacts no mitigation is necessary. However, the quality of the total visual character and image of YBC will be guided by principles and standards, and subsequent nominal City review and permit procedures.

The Redevelopment Agency policy requires the allocation of 1% of construction costs of private development to public art and embellishment, in an effort to enhance the visual quality of YBC. The City Charter requirement for a similar allocation for public buildings will apply to all such land uses in either the designated or "permitted" uses, i.e., the Convention Center and/or the Public Parking Garage.

FOOTNOTES

[1]Defined by the Transportation Element of the Comprehensive Plan as a "Cross-town thoroughfare whose primary function is to link districts within the City and to distribute traffic from and to the freeways," (Page 19).

[2]T. Conrad, Chief of Housing, Planning and Programming, San Francisco Redevelopment Agency, telephone communication, July 29, 1977.

[3]Field observation by Environmental Science Associates (ESA), July 21, 1977.

[4]A Planned Unit Development is comparable to a Conditional Use and may be considered in a designated redevelopment project area where conditional uses are not otherwise authorized by the Planning Code. The City Planning Commission on August 4, 1977 authorized 140 dwelling units as a planned unit development in the center of SB-2 under Resolution No. 7784.

[5]City Pattern Policy 4, page 10, Urban Design Element of the Comprehensive Plan, City Planning Commission Resolution No. 6745, August 26, 1971.

[6]Neighborhood Policies 2 and 3, page 19, Recreation and Open Space Element. The western and southern portions of Yerba Buena Center are identified as "high-need" on the Neighborhood Recreation Open Space Plan, page 18. The Recreation and Open Space Element was adopted by City Planning Commission Resolution 7021, May 24, 1973.

[7]City Pattern Policy 2, page 10 (Urban Design Element).

[8]Conservation Policy 4, page 25 (Urban Design Element).

[9]The 36-story Market Street tower in CB-1 may exceed the prevailing 400-foot height limit, but approval granted prior to the effective date of the limit would govern.

[10]New Development Policy 1, page 36 (Urban Design Element).

[11]New Development Policy 5, page 36 (Urban Design Element).

[12]New Development Policy 6, page 37 (Urban Design Element).

[13]The Agency will have contracted with a design consultant by mid-November 1977 to assist in formulating such standards and procedures. Citation: Thomas Conrad, Chief of Planning, Housing, and Programming, San Francisco Redevelopment Agency, personal communication, August 26, 1977, and November 1, 1977.

HOUSING AND BUSINESS RELOCATION

SETTING

Official displacement and relocation activities in the YBC area began in December, 1966 when HUD signed a loan and grant contract with the San Francisco Redevelopment Agency that authorized commencement of property acquisition, relocation of households and businesses, demolition of structures, installation of site improvements and disposition of property for redevelopment in accordance with the requirements of the Redevelopment Plan.

A survey of the YBC area taken in 1963 (E. M. Schaffran and Company) revealed that 3,170 single persons and 250 families would have to be relocated. Based on interviews with 82% of the individuals and 96% of the families, the following characteristics of the YBC population were identified:

- The majority of the households were single-person households (93%); the majority of the people were male (93%), Caucasian (87%) and over the age of 45 (68%).

- The majority of the familes had employed heads of households (65%), received an income of less than $400 per month (56%) and lived in flats or apartments (56%).
- The majority of the single individuals were unemployed (57%), received an income of less than $200 per month (57%), and lived in hotel rooms or dormitories (97%).

The number of individuals and families to be relocated was reduced to 3,050 individuals and 250 families[1] when the Victorian Hotel on Fourth Street and Jessie Street was privately rehabilitated in 1964[2] and subsequently deleted from the project area.

From 1967 to 1971 the Agency's relocation staff reduced the number of residents to be relocated to 900 individuals and 197 families. As of June 30, 1974 Redevelopmeent Agency relocation activities plus private resources had taken care of all but 300 individuals and 20 families. Most of the people (numbers not available) assisted by the Agency were relocated within the downtown area; a few of them were moved to the Western Addition. No move-ins occurred in YBC during this period as residential buildings were demolished as soon as they were vacated. A small percentage of the individuals relocated to Clementina Towers after its completion in 1971. Limited official records are available on those who relocated themselves without public assistance. Most residents who moved without public assistance notified the Agency of their new location, if only to claim their relocation benefits. Between 1974 and July, 1977 an additional 253 individuals and 19 families were relocated, mainly to hotels north of Market Street, in the western portion of the South-of-Market area, and to the newly completed Alexis Apartments and Silvercrest Apartments, which were developed for the elderly only.

HOUSING RESOURCES PROVIDED IN RESPONSE TO TOOR LITIGATION

Resource	No. of Units	Type	Completion Date
Western Park Apartments (additive)[4]			
1280 Laguna Street	11	New construction	1971
Salvation Army Harbor Lights			
1275 Harrison Street	65	Rehabilitation	1972
Alexis Apartments (adjacent to YBC)			
390 Clementina Street	206	New construction	1973
Vincentian Villa			
1825 Mission Street	124	Rehabilitation	1973
Salvation Army Chinatown Center			
1450 Powell Street	17	Rehabilitation	1972
491 - 31st Avenue	75	New construction	1974
El Bethel Arms (additive)[4]			
Golden Gate Avenue & Fillmore	22	New construction	1974
Silvercrest Apartments (in/adjacent to YBC) 133 Shipley Street	258	New construction	1974
Crescent Manor			
467 Turk Street	92	Rehabilitation	1973
Maria Manor			
174 Ellis Street	120	Rehabilitation	1974
Antonia Manor			
180 Turk Street	135	Rehabilitation	1973
Marlton Manor			
240 Jones Street	151	Rehabilitation	1974
The Alexander			
230 Eddy Street	180	Rehabilitation	1974
Notre Dame Apartments			
1590 Broadway	205	Rehabilitation	1976
TOTAL	1,661		

REMAINING RELOCATION REQUIREMENTS AND HOUSING RESOURCES

As of mid-July 1977, 47 individuals and one family remain to be relocated. These persons reside either at the Jessie Hotel on Jessie Street near Third Street or at the Planter's Hotel on Second Street at Folsom. For the most part they are elderly (one-third are over 62 years of age and none are under 30 years of age), Caucasian, and of low income.

Citywide replacement housing resources in 1971, the earliest date for which there are data on replacement housing resources, consisted of 3,180 dwelling units.[3] In addition, approximately 1,500 low-rent housing units were to be provided as part of the TOOR litigation settlement ordered by the court in November, 1970. In fact, 1,660 units were made available in response to the TOOR litigation settlement. These are indicated in the table opposite.

The replacement housing resources included 520 low-income units which were made available in the city through HUD-assisted public housing or Section 236 programs. Section 236 of the National Housing Act of 1968 provides assistance for rental and cooperative housing for lower-income families. The assistance is provided in the form of monthly payments to the mortgagee to reduce costs to the occupant by paying a part of the interest on a market rate project mortgage insured by FHA. These additional replacement housing resources are indicated below.

FEDERALLY ASSISTED RELOCATION HOUSING RESOURCES AVAILABLE FOR YERBA BUENA CENTER*

	Program	Total Units	Number of Bedrooms 0	1	2	No. Low Income[5]
1. Royal Adah Arms Apts, Turk & Fillmore Sts.	Sec. 236	142	12	130	-	47
2. 1759 McAllister Street	Subsidized Elderly	97	76	21	-	97
3. 345 Arguello Blvd.	Subsidized Elderly	69	59	9	1	69
4. 1880 Pine St.	Subsidized Elderly	113	98	14	1	112
5. 1760 Bush St.	Subsidized Elderly	108	83	24	1	107
6. 25 Sanchez St.	Subsidized Family	89	75	14	-	88
					TOTAL	520

*First priority for a vacancy given to former YBC residents if qualified in accordance with the Relocation Act of 1970.

In addition to the completed housing units, the Redevelopment Agency has committed four YBC sites for additional housing developments based on the TODCO settlement. These are shown in below.

SITES COMMITTED FOR RELOCATION HOUSING - YBC

Location	Approx. No. of Units	Construction Start Date
Site #1, Southwest corner of Howard and Fourth Streets (WB3)	112 70	1977 1978
Site #2, South side of Clementina Street west of Fourth Street (WB3)	80	1979
Site #3, Northwest corner of Fourth and Harrison Streets (SB2)	200	1979
Site #4, Between Shipley, Clara, O'Doul and Peter Maloney Streets (SB2)	140	1978
TOTAL	602	

COMPLETED BUSINESS DISPLACEMENT AND RELOCATION

At the beginning of YBC relocation activities in 1966, there were approximately 586 firms engaged in private enterprise in buildings to be acquired by the Redevelopment Agency. The makeup of the 586 firms is shown below. The number of firms to be displaced excludes businesses in buildings not acquired by the Redevelopment Agency.

As of June 1974, 508 businesses[1] had been relocated. Of the remaining businesses, five were minority owned: two Asian, one Spanish-speaking, one Black, and one Moroccan. Nearly one-half of the relocated businesses were wholesale/retail-type businesses. Of those which were displaced, approximately 60% relocated in the City, 15% relocated outside the City and 25% discontinued operation.[1] Between 1974 and July 1977, another 72 businesses were relocated.[1]

NUMBER AND TYPE OF BUSINESSES, BEFORE RELOCATION

Type of Business	Number of Businesses
Services (hotels, parking, motion pictures, etc.)	187
Retail Trade	144
Wholesale Trade	104
Manufacturing	104
Contract Construction	15
Auxiliary Warehouse	13
Finance, Insurance and Real Estate	12
Transportation, Communication, and Utility Service	7
TOTAL	586

REMAINING BUSINESS RELOCATIONS

As of July 1977, 95 businesses were located within the boundaries of YBC. Thirty-five of these, with 128 employees, were waiting to be relocated. The remaining 60 businesses, the names of which were not available from Redevelopment Agency files, with 776 employees, would continue business in YBC and would not be relocated. The characteristics of these businesses are indicated in the following table.

REMAINING YBC BUSINESSES TO BE RELOCATED AND TO BE RETAINED, 1977*

	Light Industry	Business Services	Retail	Others	Total
To Be Relocated					
Number of Businesses	2	20	11	2	35
Number Employed	10	50	60	8	128
To Be Retained**					
Number of Businesses	15	34	10	1	60
Number Employed	83	571	112	10	776

*Pertain only to businesses in YBC before start of redevelopment.

**Figures for St. Patrick's Church, PT&T (Third and Harrison), PT&T (Folsom from Third to Hawthorne), AT&T (Fourth and Folsom), Arcon/GE Building and the Community College Downtown Center at Fourth and Mission are not included.

Impacts Housing

The existing Yerba Buena Center Urban Renewal Plan, as amended, provides for 1,136 units of subsidized housing for the elderly. Nearly one-half (534) of these housing units have been completed (Silvercrest Residence, Clementina Towers). As noted earlier, four sites have been committed (as a result of the TOOR litigation settlement) for the remaining 602 elderly housing units.

The sites committed to housing units for the elderly are concentrated in the western and southern YBC blocks mainly adjacent to office and light industrial uses. These are the same general areas wherein the "permitted" housing sites discussed below are located.

Thus, the existing Urban Renewal Plan at maximum-allowed development of determined uses would provide for 1,136 subsidized housing units for the elderly (previously described) and 50 units of Market-rate housing. The Market-rate housing would be located in CB-2 on top of the apparel mart, between Mission and Howard Streets. Adjacent to it on the west would be the main pedestrian concourse to the Convention Center, and office, commercial, entertainment and hotel uses. Office and retail uses would border its eastern boundary and part of its northern boundary.

The five land parcels indicated as possible "permitted" housing sites[6] may contain up to a total of 900 dwelling units as follows (See map page IV-7):

Site #1 - up to 400 dwelling units
Site #2 - up to 100 dwelling units
Site #3 - up to 100 dwelling units
Site #4 - up to 120 dwelling units
Site #5 - up to 180 dwelling units

"At the present time, no further elderly housing is contemplated. The housing units will be primarily for families and single individuals, primarily rental units with some sales units, and with the majority of the units being available at market rate with the possibility of some limited amount of subsidized units."[6]

There are plans to provide food markets and other commercial facilities for residents at two sites on Fourth Street. Until these are provided the location of the proposed housing would require walking or public bussing distances of more than five blocks to full shopping facilities in the South-of-Market district and elsewhere in the downtown area.

As of August 1977, Redevelopment Agency records[8] show that a total of 13,000 new housing units have been built or are committed to be built in various San Francisco redevelopment areas. Of these, 8,735 have been completed and 4,323 have been scheduled for construction with completion expected by 1981. These figures include the 1,186 housing units as proposed in the existing redevelopment plan as amended.

The remaining YBC displacees would be relocated to sites of their choice, within their ability to pay under provisions of the Uniform Relocation Act of 1970. The Redevelopment Agency would bear all relocation payments (moving expenses and replacement housing payments) of these relocatees.[9] Thirteen residents in the Jessie Hotel are scheduled to be relocated in 1978, and 35 residents of the Planters Hotel would be relocated between late 1978 and early 1979. As of August 1977, Housing Authority records on citywide public housing show 387 vacancies with another 678 vacancies available when renovation is completed in 1978. The renovation program would be expected to proceed at 30 units every two weeks.[10] Preferential allocation of available housing units would be given to YBC displacees.[11]

The 1973 citywide vacancy rates[12] vary depending on the type of housing unit: hotel/guest house rooms 10.6%, studios 4.0%, and one or more bedroom units less than 2.5%. These figures do not include public housing vacancies.

As of September, 1977, there was a 6.7% vacancy rate in available public housing. The table below shows the characteristics of demand for public housing (5,716) and the supply of available public housing units. (There are 387 units available; 678 would be available when renovation is completed in 1978.)

DEMAND FOR AND SUPPLY OF PUBLIC HOUSING UNITS IN SAN FRANCISCO, BY UNIT TYPE, OCTOBER 1977

	Studio Apts.	NUMBER OF BEDROOMS 1	2	3	4	5	TOTAL
APPLICATIONS ON FILE	2,506	1,147	1,247	584	184	48	5,716
SUPPLY							
Presently Available	33	202	127	24	1	0	387
Available After Renovation	0	42	330	254	43	9	678

The ethnic and age distribution of low-income public housing applicants is shown in the following table.

DEMOGRAPHIC CHARACTERISTICS OF LOW-INCOME PUBLIC HOUSING APPLICANTS IN OCTOBER 1977

	Number of Applicants	Percent (rounded-off)
ETHNICITY		
Black	2,551	45%
White	1,449	25
Asiatic	1,092	19
Spanish Speaking	385	7
Other	217	4
Indian	22	1
TOTAL	5,716	100%
AGE		
Elderly Single	2,353	41%
Elderly Family	565	10
Non-elderly	2,144	38
TRANSFERS*	654	11
TOTAL	5,716	100%

*Applicants occupying public housing units but requesting relocation to another public housing location.

The largest proportions of applicants are Black (45%) and elderly single (41%).

All of the new YBC housing would partially replace the demolished, overcrowded and substandard housing previously existing in the redevelopment area with standard housing units and would assist in reducing the low- and moderate-income housing shortage in San Francisco, particularly in the categories of greatest demand, i.e., studio apartments and one-bedroom units.

The YBC project has contributed to this shortage by displacing 3,170 single persons and 250 families. The present shortage of low-income units would be partially ameliorated through development of the designated uses in the existing redevelopment plan by providing a total of 2,539[13] subsidized units. This amelioration could be increased depending on the number of subsidized units selected by the Agency under the "permitted" alternative uses. However, the net addition of new low-income housing units to the city's housing supply still falls below the number of units necessary to house all the persons displaced by the YBC redevelopment activities.

The location of housing units in YBC would provide convenient access for the residents to downtown service and cultural activities, city and regional transportation and a variety of employment opportunities. The provision and location of either the designated public park or the "permitted" recreation/entertainment park would offer an in-town recreation facility with access for most of the area's residents.

The location of the "permitted" housing for families and individuals as well as the designated and committed housing for the elderly in proximity to an activity node such as either the proposed convention center or the convention center and recreation/entertainment park would expose residents to increased impacts of vehicular traffic including degraded air quality. (See these assessments for anticipated impacts and mitigating actions).

The increase in the noise level due to the full development of the designated uses in the existing Urban Renewal Plan or the selection of any or all of the "permitted" other uses in expected to be barely perceptible because of the existing level of noise. Existing noise levels are high enough to place required mitigating restrictions on some of the future housing construction as described in the Noise Assessment. Potential construction - noise impacts on housing are discussed in the same assessment.

Impacts - Business Relocation

Within the YBC area, thirty-five businesses remain to be relocated. The following table shows the projected relocation schedule of businesses from August 1977 until 1980, based on anticipated schedules of marketing and disposition.

BUSINESS RELOCATION SCHEDULE, 1977-1980
YERBA BUENA CENTER

	1977	1978	1979	1980	TOTAL
Retail	1	1	1		3
Business Service		7	2		9
Personal Service		1		8	9
Professional Offices		4			4
Printers			1	1	2
Restaurants	1		2		3
Bars			2		2
Non-Profit		1	1		2
Parking				1	1
TOTAL	2	14	9	10	35

Source: Redevelopment Agency.

Encouragement will be given to every business to relocate within the YBC area by the Redevelopment Agency pursuant to its policy requirements; the number able to participate will depend on their own desires, financial capacity and the nature of lease contracts to be negotiated with private developers for specific sites.

Mitigation

Housing Relocation

Under the settlement agreement in TOOR vs. HUD, a total of 1,500 housing units were to be provided in the City to help with the rehousing of people displaced from YBC. In response to this order the Redevelopment Agency has provided 1,661 units. To accommodate a second court settlement agreement, four housing sites within the YBC area have been provided in the currently approved Plan; these are described as Sites 1, 2, 3 and 4 in the earlier table.

All remaining individuals and families to be relocated will be provided rehousing assistance and relocation payments pursuant to the Uniform Relocation Act of 1970.

Business Relocation

Pursuant to Federal relocation requirements, the Redevelopment Agency has provided and will provide financial aid to displaced businesses to help them relocate permanently within or outside the YBC area.[14]

Housing and HUD Goals

The potential total housing within the YBC Project boundaries is summarized:

534 units, subsidized elderly housing, construction completed.

602 units, additional relocation housing, subsidized elderly included in the Urban Renewal Plan.

50 units, market rate, part of Apparel Mart.

900 units, "Permitted Use" alternatives, family and adult individual-type housing.

2,086 total

The development of the Project, including subsidized and market rate, family and elderly, and single adult residential units, reflects many of HUD's operating goals. These include:

- Provide subsidized housing for low and moderate income persons who wish to stay in central city.
- Provide incentives for middle income citizens to return to, or remain in, central cities.
- Coordinate economic development with urban development initiatives.
- Expand supply of decent housing for low and moderate income persons without regard to volatile economic changes.
- Utilize housing assistance plans ("HAPs") to their full potential as tool for using housing in revitalization effort.
- Establish different program options for different types of consumers: Homeownership, Elderly Housing, Indians, Families, Disabled, etc.

- Advise people on the range of housing choices available and the concurrent responsibilities of such choices.

- In a democratic society, government must ensure that all people of all races and income levels have the opportunity to live where they choose--not just in cities, but suburbs and rural areas as well.

Inasmuch as housing considerations are integral parts of the total YBC design, including "permitted uses," the setting and impacts relating to housing are discussed under the appropriate sections throughout this EIS. The programs for advising people on housing choices and opportunities in the YBC Project area are prepared by the housing project sponsors and approved by HUD prior to approval of the housing project itself. The subsidized housing assisted by HUD in this Project is in accord with the San Francisco HAP. Market rate housing is not a part of the HAP.

FOOTNOTES

[1]W. DeHart, Supervisor, Business Services, Redevelopment Agency, telephone communication, August 18, 1977.

[2]G. Harrison, Manager, Victorian Hotel, telephone communication, October 16, 1977.

[3]San Francisco Redevelopment Agency, n.d., Yerba Buena Center Revised Housing Plan.

[4]New housing units added to existing housing units.

[5]Low-income units include those constructed under the public housing programs and those receiving federal or local rent supplements.

[6]Letter from Redevelopment Agency dated November 22, 1977 (See Appendix I).

[7]S. Dutton, Director, TODCO, telephone communication August 11, 1977.

[8]San Francisco Redevelopment Agency, San Francisco Redevelopment Program Summary of Project Data and Key Elements, 1977.

[9]W. DeHart; Supervisor, Business Services, San Francisco Redevelopment Agency, telephone communication, August 18, 1977.

[10]J. Butler, Chief of Rentals, San Francisco Housing Authority, telephone communication, November 2, 1977.

[11]Mrs. M. Yamamoto, Secretary to Chief of Rentals, San Francisco Housing Authority, telephone communication, August 3, 1977.

[12]The 1973 figures are the most current estimates available. According to the Department of City Planning (E. Levine, Planner, telephone communication, November 9, 1977), the vacancy rates have remained stable since 1973.

[13]Consists of 1,089 rehabilitated units, 848 new housing units, 602 units committed to be provided.

[14] R. Kernan, Deputy Director, Redevelopment Agency, telephone communication, December 30, 1977.

SOCIAL CHARACTERISTICS

INSTITUTIONS AND COMMUNITY FACILITIES

Social service activities provided in YBC and in the adjacent area are available to those living and working in the South-of-Market district, and in some cases, to those in the entire San Francisco area. Present YBC residents, most of whom are elderly, are provided services primarily through the building complexes in which they live, e.g., Clementina Towers and Silvercrest Residence. The services include social, recreational, counseling, and health care programs (such as blood pressure clinics and mental health services). Other types of services available in the South-of-Market district include religious activities, family support, (e.g., marriage counseling), food programs, shelter for the needy, alcoholic recovery, adult day activity programs and employment training. (See Appendix K).

DEMOGRAPHIC AND HOUSING CHARACTERISTICS

Resident population in the South-of-Market district declined during the 1960's (U.S. Census, 1960 and 1970). It is estimated that the population went from nearly 17,100 to approximately 11,000--a decrease of over 35 percent. During the same period the population of San Francisco decreased, by a little over 3%[1]. During this period the number of housing units in the South-of-Market district also declined.

Estimates for the present population characteristics of the YBC area are based upon data from the Redevelopment Agency and from the three housing complexes (Clementina Towers, Alexis Apartments, and Silvercrest Residence) built in the area or environs since 1973. Development of housing for the elderly between 1970 and 1976 brought change to the demographic and housing characteristics of the area.

There are a little over 800 persons living in the YBC area, including the Alexis Apartments and Silvercrest Residences which are adjacent to, or partially within, the area. Whites make up the largest single group at 48%, followed by Asians (20%) and Blacks (18%). As the three housing complexes were constructed for the elderly, and as approximately 95% of the people living in the area reside in the complexes, it follows that between 90 and 95% of the area residents are over 62 years of age. It is likely that the majority of the persons living in the area have low incomes, as the requirements for public housing and Section 236 housing--the programs under which the complexes were built--include income limitations.

In addition to the residents of the housing complexes there are 47 individuals and one family living in YBC who still require relocation. Of these, 90% are unemployed and dependent on public benefits of some sort.

The following table presents estimated population and racial/ethnic characteristics of all persons living in the YBC area as of July 1977, including those yet to be relocated from the area.

SOUTH-OF-MARKET SOCIAL SERVICE NEEDS

The current South-of-Market population consists of several coexisting communities representing differences in age, culture, lifestyle, and social service needs. Since World War II, communities of elderly persons and Filipinos have formed in the South-of-Market district. The growing community of low-income elderly persons is concentrated in the recently developed housing near the southwest corner of YBC. Newly arrived immigrants from the Philipines settle in the South-of-Market district, which has become a cultural and community center for Filipinos throughout the city.

The South Park area, southeast of the YBC boundaries, is characterized by low- to moderate-income families. To the west of YBC, many unemployed itinerants and a range of emotionally, physically, or mentally handicapped persons are provided with life's necessities by public

ESTIMATED POPULATION AND RACIAL/ETHNIC CHARACTERISTICS OF PERSONS RESIDING IN YBC, JULY 1977

RACIAL/ETHNIC GROUP	NUMBER	PERCENT
White	391	47
Asian	160	19
Black	157	19
Filipino	46	6
Latino	20	2
Other (unclassified)	52	6
TOTAL POPULATION	826	99*

*Does not add up to 100% due to rounding off of numbers.

SOURCE: San Francisco Redevelopment Agency; Clementina Towers, Alexis Apartments, Silvercrest Residence.

agencies and charitable organizations. Voluntary relocation from the cleared project area was predominantly to the west, and the social services currently available are concentrated heavily on the western side of YBC.

As reported in the 1974 EIS (pp. 86-88), social services and facilities required by YBC and available to the YBC area residents (i.e., within walking distance or accessible by public transportation) prior to redevelopment included the following:

- Commercial establishments (grocery stores, drug stores, barber shops, clothing stores, liquor stores, eating facilities, banks) available generally within a three-block radius of housing sites.

- Twenty-four hour public transportation service available at stops located generally within a three-block radius of housing.

- Health services (within two to three blocks of housing) and access to emergency facilities and to San Francisco General Hospital (via emergency transportation services).

- Access to public assistance offices (Social Security, welfare, unemployment assistance) and public agencies such as the Department of Social Services and the Department of Human Resource Development.

- Counselling and guidance resources.

- Food service programs.

- Religious institutions, community cultural and recreational facilities, public library, and city adult education facilities.

- Public security and protection services, i.e., police and fire protection.

As a result of the relocation and demolition which has occurred, many of the commercial establishments and facilities which once served the South-of-Market district residents are no longer available. The concern in the area surrounding YBC now as in 1973, is the inconvenience of several blocks travel for commercial services, restaurants and grocery stores.

More non-commercial social services are available to South-of-Market residents now than prior to YBC project initiation.[2] Although a few services have been removed, there has been a net increase in services available to YBC residents and those in the larger South-of-Market district.[3]

Gaps in current social service provisions as perceived by South-of-Market residents and organization representatives are discussed in a report entitled "Community Plan for Health and Social Service Delivery South-of-Market" (South-of-Market Community Planning Task Force, July 18, 1977). That report cites a need for better coordination of services and calls for an improved medical service delivery system, additional counselling and psychological services, community information and outreach programs, child care facilities, recreational opportunities and parks and open space. Vocal organizations of the area (such as the Filipino Organizing Committee, the Council of Agencies Serving the Elderly, and Tenants and Owners Opposed to Redevelopment (TOOR) have cited similar needs.

Impacts on Needs of Residents

The table below indicates the areas of increased demand for support services according to the types of housing proposed for YBC. Housing is committed for approximately 1,140 low-income elderly persons. Should the Agency select one or more of the "permitted" housing sites for development, some additional subsidized housing may be provided which would increase the overall need for social services in the South-of-Market district. The addition of up to 900 market rate dwelling units in the "permitted" housing sites would have little effect on the need for those services provided by public agencies and charitable organizations, but would affect the retail and other commercial services required.

SOUTH-OF-MARKET (S-O--M) SOCIAL SERVICE IMPACTS BY TYPE OF HOUSING

	Residents by Housing Type		
Additional S-O-M Support Services Required	Low-Income Elderly	Low-Income Family	Market-Rate Tenants
Commercial (stores, banks, cleaners, etc.	X	X	X
Public Transportation	X	X	X
Special Transportation (medical emergency and handicapped)	X	X	
Health Clinic facilities	X	X	
Health care outreach	X	X	
Fire & police services	X	X	X
Schools & day care facilities		X	
Counseling/psychological	X	X	
Food Service programs	X	X	
Recreational facilities	X	X	X
Religious/community; cultural facilities	X	X	X

Approximately 750 units of housing for low-income elderly persons currently exist in three housing complexes (Clementina Towers, Silvercrest Residence, and Alexis Apartments) within and adjacent to the YBC area which provide food preparation or dining facilities, laundry facilities and community meeting rooms. The Silvercrest Senior Citizens Residence and Club provides transportation and lunch services, and recreational, educational, health and social programs. These services would be expanded to serve all elderly residents of the area.

The Tenants and Owners Development Corporation (TODCO) is under contract to the San Francisco Redevelopment Agency to provide an additional 600 units of housing for the elderly. Prospective tenants are expected to be 62 or older, to have an income of less than $6,000 per year, and to be in good health. No special facilities for the disabled would be provided within the housing.[4] TODCO researchers expect that the tenants would be drawn from the Inner Mission, North-of-Market, Chinatown, North Beach, and South-of-Market district areas. Plans for commercial services within the housing complexes include grocery stores, restaurants, dry cleaners and laundromats to serve about 1,500 customers. In addition to food preparation and dining facilities, each complex would provide facilities for a resident social worker, a counselor, and community functions and entertainment. These services along with those currently available would satisfy much of the additional need for social services expected to be generated by the increased numbers of elderly residents.

Space for garden plots to be used by elderly residents is also included in the plans. These would be fenced off from the street to deflect air currents carrying pollutants from passing vehicular traffic.[5]

Most market-rate housing units would probably be tenanted by employed adults, with an average of two persons per unit. This estimate is based on the tenancy experience of the apartments in the Golden Gateway in downtown San Francisco. The increased demand for commercial services by this population could be a market stimulus and encourage development of retail establishments in the area. The selection of all the "permitted" sites for market-rate housing would add between 1,300 and 1,800 persons in market-rate housing, depending on the number of subsidized housing units provided.

Effects on, and Impacts of, Current and Planned Services

The additional housing to be built (which is in the approved Urban Renewal Plan as amended) for the elderly, would have a small-to-moderate impact on the services provided by the South-of-Market Clinic,[6] based on behavior patterns among the elderly currently residing in the area. As perceived by the director of the Clinic, this is because most elderly persons are established as clients with private doctors whose care they are reluctant to leave. An increased demand for services by those who do not ordinarily seek health care services is perhaps more likely to be through subscription to outreach services such as the blood pressure

screening program currently sponsored by the South-of-Market Clinic. Low-income families are more likely than are elderly residents to make use of the Clinic itself, but it is felt that with the expansion of services, the existing facility would probably be adequate to serve the greater case load. Resident access to medical services, especially under emergency conditions, is recognized as a current problem which might worsen with increased YBC population.[7] (Also see Community Services: Medical Services).

The provision of commercial services would depend upon the market demand of the area. The addition of all types of housing in YBC would be a stimulus to the establishment of resident-serving commercial facilities. The Salvation Army, for example has tentative plans for the development of a 10,000-sq.-ft. commercial complex geared to the shopping needs of the elderly and including small businesses such as a "Mom and Pop" grocery store, a hair dresser, and a cleaning and laundry service.[8] Because the market demand for the planned services is not currently adequate to justify the venture, development is contingent upon the amount of additional patronage generated by future housing and employment. Similarly, other population-serving businesses would be attracted to the area if the total population were sufficient to support them.

A new Downtown Community College Center is planned to be housed in a new eight-story structure located on the corner of Fourth and Mission Streets. This facility, scheduled to open in February 1978, is designed to serve approximately 10,000 students per day. It will offer both credit and non-credit classes in a variety of market-oriented and general program areas, becoming an educational and cultural resource for area residents and others in the City. No programs are specifically geared to the elderly.

Mitigation

The YBC area is populated now almost entirely by low-income elderly people. Any market-rate housing would tend to broaden the population mix of the area to the extent that housing for other population groups would be provided. Subsidized-family housing would tend to add children while market-rate housing would add mostly a non-elderly population. Combining the impacts of subsidized-family and market-rate housing would mitigate the present homogeneity of YBC area demographic characteristics.

A feasibility study is currently underway for a University of California medical center, tentatively proposed for location at the corner of Fourth and Howard Streets.[9] This facility would provide services to area residents (as well as functioning as a school of continuing education in the medical sciences), easing the possibility of case overload at the South-of-Market Clinic.

To provide for medical emergencies, especially as related to the elderly, the need for expansion and coordination of special transportation services currently provided by the Fire Department, the Department of Public Health and the South-of-Market Clinic has been recognized,[10] although there are no formal plans at the present time to improve these services. In November 1977, the Canon Kip Community House expanded its non-emergency van service which provides transportation for the elderly to medical, shopping and recreational facilities. This service, which has been functioning on a limited basis since mid-1977, now operates with 30 drivers and 17 vehicles on a 14-hour-day basis, including weekends. Supported by the Federal Department of Transportation, the San Francisco Commission on Aging, the Federal Community Employment and Training Act (CETA) and private foundations, it is able to provide free transportation to elderly South-of-Market residents by arrangement.[11]

Appendix K contains a list of the social services available in the South-of-Market area.

FOOTNOTES

[1]This decline may be within the margin of error of the Census counts.

[2]W. DeHart, Supervisor, Business Services, San Francisco Redevelopment Agency, telephone communication July 13, 1977.

[3]E. Coleman, Executive Director, Canon Kip Community House, San Francisco, personal interview, August 1977.

[4]S. Dutton, Director, TODCO, telephone communication, August 11, 1977.

[5]S. Dutton, Director, TODCO, telephone communication, November 10, 1977.

[6]Dr. W. Shore, Director of the South-of-Market Clinic, telephone communication, August 10, 1977.

[7]South-of-Market Planning Task Force Report (draft), July 13, 1977; confirmed by Dr. W. Shore, telephone communication, November 11, 1977.

[8]Major O. Youngquist, Secretary of the Northerb California Division of the Salvation Army, telephone communication, September 1, 1977.

[9]M. Mann, Business Development Specialist, Real Estate Division of the San Francisco Redevelopment Agency, telephone communication, December 5, 1977.

[10]South-of-Market Planning Task Force Report (draft), July 18, 1977.

[11]B. Armstrong, Coordinator of the Senior Center, Canon Kip Community House, telephone communication, December 5, 1977.

ECONOMICS

SETTING:

The YBC Project is at this time an area largely vacant of buildings in its central blocks, but with a number of commercial automobile parking lots on the northern portions. It is under a cloud of local concern for proceeding with the development of the convention center and other potential commercial and office space structures. The long period of litigation and the lack of visible construction activities has contributed this cloud.

The economic setting remains constrained by the uncertainties of the Project brought on by long years of opposition, litigation, and stagnation. Initially, adjacent economic interests had been moving to take advantage of the developing Project, but few nearby businesses and other economic forces have been taking actions in anticipation of the Project's development in recent years. Until final local environmental and political decisions, along with necessary federal approvals, are made and new construction activities are substantially under way will inter-related economic forces begin to interact with Project potentials.

The most visible economic activity of the YBC Project is its commercial parking of automobiles. Many of the parcels acquired by the Redevelopment Agency have been cleared of structures and the land leased out to private parties for this interim parking use. Some 5,800 parking spaces are estimated to be available at this time in the Project area.

In terms of employment, between 1965 and 1970 the South-of-Market area as a whole experienced an 18% increase in employment. Most of the growth was generated east of Third Street between Market and Folsom Streets, outside the YBC area. Wholesale trade and government activities declined, while contract construction, communications, and services experienced growth.

Within the YBC Project, employment declined between 1965 and 1970, as some wholesaling, warehousing, and manufacturing uses were displaced. Parking lot activities employ relatively a small number of persons.

Current YBC employment is at a level of 4,600 (See Table following). The number of employees in the communications industry--3,550 persons--reflects the Pacific Telephone Company buildings which have been constructed since 1970. The American Telephone and Telegraph Company has added another 800 persons to the total since its long-lines building has been completed. The second largest employment category is business and repair services.

ESTIMATED EMPLOYMENT, JULY 1977, YBC

Industry	Employees Number	Employees Percent
Communications	3,550	77%
Business and Repair Services	621	14%
Retail Trade	172	4%
Manufacturing	93	2%
Health Services	53	1%
Construction*	50	1%
Other Industries**	32	1%
Finance, Insurance and Real Estate	18	0.5%
Educational Services	10	0.2%
TOTAL	4,599	101%***

*Does not include construction workers at San Francisco Community College.
**Does not include transportation, wholesale trade, personal services, other professional and related services and public administration.
***Does not add up to 100% because of rounding of numbers.

SOURCE: San Francisco Redevelopment Agency; Pacific Telephone and Telegraph Company; American Telephone & Telegraph Company; Jefferson Associates, Inc.

Project Impact:

Net employment is defined as that which would not be generated elsewhere if YBC were not developed. It is assumed, for example, that most office development could occur elsewhere in the City, but that a convention center would not be developed elsewhere. This assumption would mean that, in the absence of YBC development, market forces would lead to the development of near equivalent amounts of employment-generating office space elsewhere in San Francisco.

The growth in service employment on a citywide basis has been increasing at a relatively steady annual rate of 7%. Most of the new service jobs generated by the YBC project development are expected to be held by service and office workers.

PERMANENT (NEW) EMPLOYMENT ESTIMATES FOR YBC BY LAND USE TYPE

EMPLOYMENT - 1988							
OFFICE	RETAIL	LIGHT INDUSTRY	DOWNTOWN SUPPORT	CONVENTION CENTER	REC/ENT PARK	OTHER*	TOTAL
25,410	860	2,150	--	160	10***	510	29,100**

*Includes employment related to following uses: community services, pedestrian concourse, parking and commercial entertainment.
**Variant uses could increase on decrease 1980 totals estimated to a range of 5,000 workers.
***These numbers apply to the public park.

1988

OCCUPATIONAL CATEGORY	NUMBER OF EMPLOYEES
PROFESSIONALS	5,080
MANAGERS	4,030
CLERICAL	10,600
SALES WORKERS	3,150
CRAFTSMEN & FOREMEN	300
OPERATIVES (BUILDING ENGINEERS)	1,400
TRANSPORT	30
LABORERS	40
SERVICE WORKERS	4,470
TOTAL	29,100

SOURCE: Lord and LeBlanc and Jefferson Associates.

POTENTIAL CONSTRUCTION EMPLOYMENT, YBC PLAN 1977-1988

Total Estimated Construction Cost	1977-1988 Construction Employment+ (Person Years)
$629,000,000	13,900

+Based on the proportion of construction costs for labor (40%), assuming $98 average wage per day and 185 construction work days per year.

SOURCE: Lord and LeBlanc and Jefferson Associates.

It is noted that the Convention Center structure is the single largest construction and operation facility in the Project. The employment generated for this development and its future operations will provide most of their jobs for low and moderate income workers. The Convention Center construction jobs, as well as those for other Project construction activities will be made available to all persons on an equal opportunity basis pursuant to the Redevelopment Agency's Affirmative Action Program. In addition, minority contractors and supplies are included in the Redevelopment Agency's policy for developing and assisting minority entrepeneurs. The funding of the Convention Center (both initial construction and subsequent operation) is a local responsibility and these costs are paid and received by the City and County of San Francisco. The City will pay for the construction of the Convention Center with designated revenues from its hotel tax and proceeds of its bond sale. Operating loses are to be covered by the hotel tax. These loses are estimated to be not more than $750,000 per year for the first four years. City General funds are not pledged for the construction or operation of the Convention Center.

The chart on the following page on Project development is to reflect the potential magnitude of economic development in terms of footage, rooms and parking spaces.

YBC PROJECT DEVELOPMENT - SQUARE FOOTAGE AND SPACE DEVELOPMENT

	-Parking Spaces	-Hotel Rooms	-Pedestrian Concourse (sq. ft.)	-Commercial/ Entertainment (sq. ft.)	-Light Industrial (sq. ft.)	-Office Space (sq. ft.)	-Commerical/ Retail (sq. ft.)
Urban Renewal Plan at Maximum Development		700	153,000	400,000	1,215,000	7,760,000	760,000
Variant or other permitted uses: Space additions and deductions.							
Parking Garage	1,250					(687,250)	
Housing Proposals							
Site 1 - 400 units						(586,000)	60,000
Site 2 - 100 units						(500,000)	50,000
Site 3 - 100 units						(304,900)	
Site 4 - 120 units					(515,000)		
Site 5 - 180 units	(760)				(288,750)		
Total 900 units							
Location Change to CB-1 of Hotel, Leaving Office/ Entertainment/Commercial behind (Hotel was on top						(630,000)	(35,000)
Location Change of hotel to CB-1 and CB-2 + Recreation/Entertainment Park			(82,500)	(400,000)		(1,330,000)	(75,000)
Recreation/Entertainment Park, delete Hotel		(700)	(82,500)	(400,000)		(1,330,000)	(40,000)

Note: If the parking garage, which is one of the variant uses, is to be developed, it would provide about 1,250. It would also reduce the office space development by 687,250 square feet. The Convention Facility is not included because it is below ground level.

BUSINESS DEVELOPMENT:

A major result of the YBC development will be the business generated by its activities and facilities. Estimates for these are difficult because there are many unknowns and because of the variant or alternate permitted uses that may be substituted. Moveover, the successes and failures of public and private enterprises to attract businesses and customers will affect the results.

YBC will eventually produce (1) new commercial space and some residential additions; (2) a considerable daytime working population, and some nighttime visits, and (3) a series of attractions, such as the convention center and possibly a recreation/entertainment park, that would tend to reinforce the vicinity as the newest zone of day and night activity in San Francisco. The completion of YBC could result in the construction of a nearly six-year citywide supply of office space. Not all future office space users would desire a YBC location, so the actual absorption of office space in YBC would be a function of the total San Francisco office market, of projects being developed elsewhere, including on parcels nearer the center of the Financial District.

Figures for attendance at the new convention center functions are not available, but experience in other cities indicates that perhaps 255,000 delegates (1980) annually would attend functions in the facility. One recent study by R. Gryziec on the recreation/entertainment park estimates an annual visitation level of up to 6.5 million.

Because publicly owned convention centers must set their user fees at a level which will make them competitive with similar facilities in other cities, nearly all convention centers operate at a loss. In 1976-77 the Civic Auditorium and Brooks Hall experienced a net operating loss of $343,748. Included in this loss calculation were salaries and mandatory fringe benefits paid to 11 Department of Public Works employees who work full time at the Civic Auditorium and Brooks Hall. Most of the operating costs for Brooks Hall and the Civic Auditorium are incurred for salaries, benefits, and overtime pay for a combined staff of 40 persons.

Brooks Hall and the Civic Auditorium operated at or near full booking capacity in fiscal year 1976-77. With competition from the new YBC convention center, operation of the older facilities at less than full capacity (at least in initial years) could be expected, and operating revenues can be expected to decline. Because most of the Brooks Hall-Civic Auditorium expenses are for wages and salaries for maintenance and direct labor, some reduction of operating expenses, and shifting of personnel from the older facilities to the new YBC convention center might be possible.

Information on recent convention experience in San Francisco and on Bay Area meeting and exhibit hall space is reported on the following charts. Attendance projections for the recreation/entertainment park forecast an intensive use of the proposed facility. Peak period use of that YBC park which would occur on weekends in the summer tourist season is projected at some 26,000 visitors daily. A recent study of the Fisherman's Wharf area disclosed similar ranges of visitation; the Mayor's Select Committee Commercial Development Team presented similar findings.

Were the recreation/entertainment park to be developed, it is expected that the YBC area would emerge as a competitive influence in the overall City pattern of attraction to visitors. With that park in full operation, increases in the need for public protection, traffic management and related population-oriented services could be expected.

CONVENTIONS AND ATTENDEES, CITY OF SAN FRANCISCO, 1973-1976

Year	Conventions	Registrants
1973	787	568,308
1974	851	718,871
1975	888	676,576
1976	878	753,785

Estimated 1976 Convention Size:	Percent	Conventions	Registrants
Fewer than 1,000 Registrants	60%	527	210,800
1,000 to 3,000 Registrants	30%	263	315,600
More than 3,000 Registrants	10%	88	227,385
TOTAL	100%	878	753,785

SOURCE: San Francisco Convention & Visitors Bureau; Lord & LeBlanc

EXISTING BAY AREA NON-HOTEL MEETING AND EXHIBIT FACILITIES

FACILITY	Usable Exhibit Floor Space (Sq. Ft.)	Exhibit Booth Capacity (Number)	Seating Capacity	Approximate Rental, Full 24-Hr. Day[c]
Civic Auditorium:				
Main Arena	32,600	186	8,000[b]	$1,000-1,500
Polk Hall	7,600	43	500-900[a]	$150-300
Larkin Hall	7,600	43	500-900[a]	$150-300
Brooks Hall	90,000	500	4,000-5,000[a]	$1,000-1,200
War Memorial Opera House	N/A	N/A	3,250	$1,350-2,100
Veterans Memorial Building	N/A	N/A	1,600	$450-550
Masonic Auditorium	16,500	128	3,165	$1,100-1,500
Cow Palace:				
Main Arena	43,000	100	10,000[b]	$1,500-2,500
Exhibit Hall (North)	49,000	280	7,000[a]	$750
Exhibit Hall (South)	49,000	280	7,000[a]	$750
Exhibit Buildings (Lower)	126,000	700	10,000[a]	$1,000-1,200
Candlestick Park	N/A	N/A	61,000	$5,000-6,000
California Academy of Sciences	N/A	N/A	400	
Hall of Flowers	14,000	80	2,700	$210-550
Kezar Stadium	N/A	N/A	58,900	$500-3,000
Winterland	8,000	50	5,400[b]	
Curran Theater	N/A	N/A	1,770	
Longshoreman's Auditorium	N/A	N/A	2,220	
California Hall	N/A	N/A	1,250	
Palace of Fine Arts Theater	5,400	30	1,000	
Japan Center Theater	9,200	50	850	$350-1,000
Scottish Rite Auditorium	N/A	N/A	700	
International Center	N/A	N/A	776	

EXISTING BAY AREA NON-HOTEL MEETING AND EXHIBIT FACILITIES (CONTINUED)

FACILITY	Usable Exhibit Floor Space (Sq. Ft.)	Exhibit Booth Capacity (Number)	Seating Capacity	Approximate Rental, Full 24-Hr. Day[c]
Other Bay Area Locations				
Oakland-Alameda County Coliseum	120,000	686	14,000 Arena 54,000 Stadium	
San Jose Convention & Exhibit Hall (under construction)	30,000	170	3,300[a]	$1,100-1,500
San Jose Center for the Performing Arts	N/A	N/A	2,700[a]	$380-600
San Jose Civic Auditorium	9,300	50	3,300[b]	$900-1,200
Miscellaneous Meeting Rooms	17,200	95	2,800[a]	$90-225
Marin Civic Theater	23,000	130	2,000[b]	$450

[a]Removable seating on one level.

[b]Combination of removable seating and permanent seating.

[c]Blank spaces--information not available.

San Francisco would experience certain general socioeconomic impacts from the development of YBC. One major impact would be the general rise of jobs and business income in the City, on a temporary basis, flowing from initial construction, and later from net permanent office and service employment generated.

Other general impacts affecting the relative well-being of San Francisco residents are: (1) increases in the value of private properties, and revenues flowing from those increases to local public agencies; (2) any costs of servicing the development added in YBC which are not offset directly by user charges or additional public revenues; (3) increases in the local housing stock associated with full development; (4) increases in general business activity associated with completion of the new convention center facility; and (5) similar, related multiplier phenomena that revolve around income generation and public finance.

Retail space that might be added is estimated from 650,000 to 830,000 square feet. These levels may be compared with the approximate scale of shopping centers found in less urban locations: 100,000 sq. ft. for a convenience center and more than 500,000 sq. ft. for a regional center.[1]

Retail trade in the South of Market District reflects overall city trends in the retail market. Thus, if new space is required it would seem to be oriented around such emerging consumer markets as tourism, entertainment industries, and office buildings. Thus, the decision to market land for retail purposes would seem to be contingent on the mix of uses to be recommended for YBC and their accompanying need for retail space as supportive service and amenities.

The Commercial Development Study Team for the Mayor's Select Committee in 1976 pointed out: "In the future, it appears that apparel manufacturing, printing and publishing, and incubator industries will provide the most active demand for space in the (South-of-Market) area." The apparel industry is the second largest manufacturing industry in the City, and the only one to realize a substantial absolute employment growth with employment increasing by 1,470 during the 1962-72 period, and by 1,290 between 1972 and 1973. The proposed apparel mart, to the extent that it would promote San Francisco's fashion and design leadership, might have a complementary effect upon the apparel manufacturing industry in San Francisco's South-of-Market industrial areas. Announced expansion of an existing apparel facility at Fourth and Market Streets, adjacent to YBC, indicates the strength of the industry in San Francisco, but may reduce the demand for space in the YBC apparel mart.

The real demand for first class office space has not been tested in the YBC Project. The potential of up to 7,760,000 square feet of new office space is a substantial amount and would have to be developed over a period of years.

The major demand areas for first class office space at this time are generally along lower Market Street, the financial district and Embarcadero Centers and along the nearby waterfront. Some eleven new high rise office buildings are projected for construction within the next four years in these areas.

While untested, the YBC Project area is unique in several aspects which may cause it to develop into another first class office space area. These features include:

1. The Project area (87.3 acres) is sufficiently large to create a sense of neighborhood or area, rather than a small isolated pocket.
2. YBC is to be developed in a coherant manner, as a single integrated plan. Development will be in a theme without haphazard development or poor structural bulks and designs.
3. The high-rise office buildings, upon completion of YBC, will have good views of the immediate convention center, recreation areas, pedestrian malls and nearby developments. The views will be largely unobstructed because the surrounding area to YBC is generally only several stories high.
4. YBC offers cleared, assembled and parcelized land at a fair market price. Such land is not available for large highrise development elsewhere in or near the downtown or Financial District of San Francisco.
5. YBC is well served by freeways and public transportation.

According to economists at Arthur D. Little, Inc., the future of a retail space in the South of Market is not clear:

> A potential surplus of existing retail space appears to be present in South of Market. To the extent that increases in retail space demand occur, the demand is likely to be for different types of retailing uses than are dominant in the area today, particularly eating and drinking places and other employee and tourist-oriented retailing. Therefore, a necessary consolidation no more than 40-50% of total ground floor area in new office developments is likely to be justifiably devoted to retailing, and possibly less.

Even at established ratios of office employees to retail employees (50 to 1) and office space to retail space (20 to 1) the current plan calling for 7.7 million square feet of office space at YBC would need approximately 385,000 square feet of retail space as support. This is near the current retail space component for YBC. A convention center with maximum attendance of approximately 25,000 delegates could conceivably require the use of an additional 300,000 to 400,000 square feet of retail space (shopping, eating and drinking places, etc.) in the general area near YBC. Approximately 50 percent of the city's existing retail space, or some 10 million square feet, presently exist in the Central Business District within walking distance of YBC. Thus, spillover coming from the convention hall would most likely be handled by existing space in the area with the exception of eating and drinking places where specialized demand might be in excess of existing space. It should be noted, however, that this retail space would be built somewhat at the jeopardy of existing retail space in downtown unless activity generators such as a convention hall are planned concurrently.

The development of the permitted market rate housing, up to 900 Units, will affect the Project in both positive and negative terms. The housing will replace 803,750 square feet of light industrial footage, which is 66 percent of the YBC total. The housing will also replace 1,390,900 square feet of office space, reducing the YBC amount by 18 percent. Some 110,000 square feet of commercial/retail would be added along with the housing.

These square foot changes reflect a shift in the YBC orientation. The housing would negatively affect the tax generation to the City through a reduction in business and property taxes, as well as reductions in sales taxes, business license fees, and supporting businesses services (office supplies, business machines, restaurant services, etc.). A modest reduction in land proceeds would result from the sale of land for residential purposes as opposed to office/commercial uses. The loss of industrial/office employment would be a major adverse impact of utilizing the permitted housing.

The basic positive impacts of the permitted housing are non-economic. Rather, they are programmatic, providing housing and meeting other departmental housing related goals.

The costs of public services, such as police, fire, library and medical, vary insignificantly between housing and industrial/office development.

The economic impacts of the Project are generally beneficial. Employment during construction and during the long term Project life will be beneficial. There may be different kinds and numbers of employed persons among the various varient or alternative uses, but any of such uses would result in greater employment than now exists.

Concern is expressed that the commercial activities need to be planned and carried out so as to minimize direct competition with downtown retail store mechandise, especially specialty shops. The impact is not considered substantial because of the Project's limited area and location, the numbers and kinds of long established retail concerns in downtown, and the other competitive factors.

The Convention Center will adversely affect to some degree the convention activities now going to Brooks Hall and Cow Palace. The degree of this adverse impact will depend on several inter-related developments. For example, the YBC Convention Center is under planning for the development of a huge facility, which can be divided into smaller facilities depending on the number of size of conventions and/or exhibits planned for a particular time. It is probable that such Convention Center facilities will be substantial improvements over Brooks Hall and the Cow Palace. There may also be some, but undetermined diversion to the Convention Center from other San Francisco hotel facilities and Bay Area facilities.

Current operating loses by Brooks Hall area paid for from the City's General Fund. This method of financing will be continued and extended to any additional losses by Brooks Hall that may be attributable to the YBC Convention Center or from any other source. The initial cost of Brooks Hall in 1954 was $3,275,000 and was paid for by a General Obligation Bond issue. These bonds have been retired.

The number of very large conventions that would be net additions of convention business to San Francisco is estimated to be few annually.

The net diversions from Brooks Hall and the Cow Palace will cause some economic hardship on the operation of those facilities. However, for the convention delegates and visitors at the exhibits, the diversion may be a welcome one. There have been a number of adverse comments of such facilities and most participants are expected to welcome improved facilities.

At this time, there are only opinions and speculations over the long term results. The numbers of convention delegates and other visitors to the YBC facility will not be a net decrease to San Francisco.

New office building construction in the YBC Project area is expected to attract construction from other prospective sites in San Francisco. When these kinds of diversions do result, the impact of the new construction in YBC is likely to delay similar construction on the diverted site. Since San francisco is essentially fully developed in alternative areas for high rise office space buildings, the use of YBC lessens the immediate and direct impact on those other areas. It may also be noted that high rise office buildings in YBC by Redevelopment Agency policy are required to have art/sculpture work equal to at least one percent of construction costs. In this way, the structures include built-in aesthetic considerations.

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FINANCIAL FEASIBILITY

Protection of Federal HUD Financial Interest in Urban Renewal Project Financial Setting

The Federal Urban Renewal Program was established by Title I of the Housing Act of 1949 to assist localities in the rejuvenation of physically blighted or deteriorated areas. Eligible activities under this program include planning for reuse of land; acquisition of property; relocation of residents into decent, safe sanitary housing; relocation of business firms; rehabilitation of structures that are capable of rehabilitation and will conform to the land use plan; and demolition and site improvements necessary for the preparation of cleared land for resale to private or public developers.

Urban Renewal program applicants may be either local governing bodies or redevelopment agencies, as authorized by State enabling legislation. Initial applications are made to the Department of Housing and Urban Development (HUD), in accordance with legislative criteria and Federal regulations as contained in HUD's Urban Renewal Handbook (RHA 7200 through RHA 7228). Upon approval by HUD, Federal grant funds are reserved and a survey and planning advance is made.

During this planning phase, buildings and social needs are surveyed and an Urban Renewal Plan is prepared. This Plan, when adopted by the local governing body after necessary public hearings, becomes the governing document with regard to acquisition, demolition, land use and building controls for all new development and rehabilitation in the project area.

Upon HUD approval of the locally adopted Urban Renewal Plan, a budget, financing plan, and loan and capital grant contract are signed by HUD and the Redevelopment Agency committing Federal funds to assist in the project. The amount of Federal funds required is determined in the following manner:

Gross Project Costs (all estimated project expenditures)
-Disposition Proceeds (estimated money to be earned from the resale of prepared land)
=Net Project Costs (expenditures not covered by land proceeds)
x 2/3 (eligible Federal share of Net Project Costs)

= Federal Grant

The Gross Project Cost consists of all expenditures made by a Redevelopment Agency for a given urban renewal project. The new project cost is the gross cost less proceeds from resale of land. The eligible Federal grant is two thirds of the net project cost. The remaining one-third share of the net project cost must be provided locally, either in cash, or through certain public improvements or supporting facilities known as non-cash credits.

The Redevelopment Agency is authorized by HUD under the Contract for Loan and Grant to secure a loan adequate to cover the initial cost of acquisition, site preparation, relocation, interest and administration. As land is prepared and sold, the proceeds are used, in conjunction with the Federal grant, to repay the outstanding loan. Financial settlement is made at the completion of the project when all LPA activities are completed and all land has been sold.

In addressing the financial impact of the proposed changes in the Urban Renewal Plan for the Yerba Buena Project, Calif. R-59, those elements which could jeopardize the security for loans made or authorized under the current Loan and Grant Contract must be considered. This Contract provides that the Federal Government will provide up to 2/3 of the net cost of the project with the locality providing not less than the remaining 1/3 net cost. The local contribution can be in cash or non-cash items. Non-cash items consist of improvements such as street work, public parking or similar facilities which are of benefit to the project.

The current financing plan for this project shows the following principle items:

Budgeted Item I costs (project activities)	$ 68,003,637
Item II costs (non-cash)	57,080,882
Gross Cost	125,084,519
Less land sale proceeds	-26,418,153
Net Cost	98,666,366
Local Share (not less than 1/3)	59,819,882
Project Capital Grant (not more than 2/3 of net cost)	38,846,484
Relocation Grant	8,034,755

Item I costs include Redevelopment Agency expenditures for project execution activities such as land acquisition, relocation, demolition and site preparation, public improvements, planning, administrative, and interest costs. Item II costs are locally funded public improvements which benefit the redevelopment project.

The amount of the Federally secured loan authority is determined as follows:

Item I costs	$68,003,637
Relocation Grant	8,034,755
Rehabilitation Grant	-0-
	$76,038,392
less cash contributions	2,739,000
loan authority	$73,299,392

This loan ($73,299,392) is secured by the total Federal grants ($46,881,239) and land proceeds ($26,418,153). "Land Proceeds" are the funds received by the Redevelopment Agency from its sales of Project land.

The protection of the Federal interest is defined in Section 570.802(a)(1) of the Community Development Block Grant regulations as follows:

> "The Federal Government's financial interest in existing urban renewal projects shall be determined to be sufficiently protected if the Secretary finds that all temporary loans made or authorized to be made can be repaid without additional project grants, taking into consideration the costs incurred or to be incurred, the estimated proceeds upon any sale or disposition of property, grants approved under the HUD contract for the project, and any other funds which are to be provided for completion of the project, including the repayment of temporary loans."

Impacts

It is possible that the proposed land use changes may result in a reduction of land proceeds. This could render the Federal loan insecure. Under the provisions of the Housing and Community Development Act, this deficit can be funded from 1) local resources, 2) Community Development Block Grant funds budgeted voluntarily by the locality or 3) Community Development Block Grant funds withheld by HUD from the locality's entitlement.

If the plan changes were to result in a reduction of land values, below the amount needed to repay the outstanding loan, HUD would request that the locality fund the deficit. If the locality were to decline, HUD has the authority under Section 570.802(b) of the CDBG regulations to withhold up to 20% of a City's entitlement in any year to protect the Federal interest in the City's urban renewal program. For FY '78 this withholding could amount to $5,237,800. For FY '79 and FY '80, the last of the current three year authorization for the Community Development Block Grant Program, 20% of the City's entitlement for each year would be around $5.8 million for a three year total of approximately $16.8 million.

While 20% of any of the City's next three years entitlement should be adequate to cover any reduction in land value in the Yerba Buena Project, this is the only assured source of funds for protection of the Federal interest in all urban renewal projects of the City of San Francisco. Therefore, the City's other Federally assisted projects must be examined to determine if they are financially secure or if there is any land deficit situation in any of these projects.

In addition to the possibility of reduced land proceeds in the Yerba Buena Center Project, the land proceeds in the Golden Gateway are deficient by approximately $433,000. All other projects (Western Addition A-2, India Basin Industrial Park, and Hunters Point/Stockton/Sacramento) appear to be providing the land proceeds in an amount sufficient to repay the outstanding loan. In fact, the latest loan repayment plan of the San Francisco Redevelopment Agency projects land proceeds in an amount greater than need to repay outstanding loans for the India Basin and Western Addition Projects. In the case of the Golden Gateway Project the land proceeds deficit will be made up from excess land proceeds from the Diamond Heights Urban Renewal project and from Community Development Block Grant funds already budgeted by the City.

In addition to being concerned that there are sufficient funds to repay outstanding loans, HUD is concerned that there are adequate funds available to cover the interest charges on the outstanding loans. The current outstanding loans for the City's five active Federally financed projects total $59,485,000. The total amount of interest charges due on these loans when they mature at various times during calendar year 1978 is $1,802,966. These interest costs are paid for from both urban renewal funds and Community Development Block Grant funds. As the availability of urban renewal funds are reduced a heavier reliance will be placed on Community Development Block Grant funds to pay interest costs. It is our understanding that the City will continue as it has for the past four years to voluntarily budget funds to cover interest charges and land proceeds deficits.

If the City continues to voluntarily budget funds for these purposes the Federal interest in the City's urban renewal program will be secure. Should the City not budget needed funds, the Federal interest can be secured by HUD withholding for any given year up to 20% of the City's entitlement.

In the case of the Yerba Buena Center Project land value has been increasing. Land proceeds were earlier estimated at $18,925,580. This value increased to $26,418,153 in 1974. The Agency's most recent loan repayment plan that was submitted to HUD on December 19, 1977 shows that based on current land values $31,832,023 in land proceeds are anticipated from the sale of all remaining project land. Of this amount $23,174,242, which is sufficient enough to repay the outstanding loan, is anticipated by 1982. The additional $8,657,781 will be received between 1983 and 1988.

If we add to the above estimate of $31,832,023 the $2,000,075 in land proceeds already received we have total land proceeds actual and estimated of $33,832,098, an increase of $7,313,945 over the amount in the current financing plan.

The current loan outstanding on the Yerba Buena Center Project is $26,035,000. The remaining loan authority is $1,791,604. The balance of the original loan of $73,299,392 has been used and repaid. To protect the Federal interest, security equal to the outstanding loan plus remaining loan authority or $27,826,604 would be required.

The loan security consists of unpaid Project Capital Grant of $3,523,376; unpaid Relocation Grant of $1,112,566 and land proceeds. If we use current estimated land proceeds of $31,832,023 we have:

Total Federal Grants Unpaid	$ 4,635,942
Land proceeds	31,832,023
Security	36,467,965
Loan	27,826,604
Surplus	8,641,361

If on the other hand as a more severe example, plan changes were to reduce land value by as much as $5,000,000 (this figure is based on Redevelopment Agency's studies of possible land value reductions due to "permitted" changes) we would have

Total Federal Grant Unpaid	$ 4,635,942
Land proceeds	26,832,023
Security	31,467,965
Loan	27,826,604
Surplus	3,641,361

If we use the land proceeds figure ($26,418,153) in the approved 1973 financing plan and reduce it by $5,000,000 the deficit is $1,772,509. This amount is within the range where the Federal interest can be protected by withholding CDBG funds to cover land proceeds deficit.

From the above examples it can be seen that the affect of introducing a recreation/entertainment complex and/or additional residential housing to the YBC plan could range from reducing the amount of excess land proceeds anticipated to creating a land proceeds deficit. If there is a land proceeds deficit and the deficit is made up from Community Development Block Grant funds this would mean there would be less block grant funds to undertake other housing and community development activities. An additional effect could be that repayment of the loan could be postponed for a period of time thus requiring an additional small amount of Community Development Block Grant funds to pay the interest charges.

Any decline in non-cash grants-in-aid provided as a result of plan changes can be adjusted at the time the project closes out. Under the Community Development Block Grant Program an urban renewal project may be financially settled based on the non-cash local grants-in-aid actually provided.

Mitigation

In view of the fact that; 1) the remaining Federal grants for this project are assured; 2) that under the Community Development Block Grant Program San Francisco is assured of about $26,000,000 a year from which any deficit can be funded; 3) the amount of any potential deficit does not appear to exceed 20% of the City's annual Community Development Block Grant entitlement; and 4) the City has been providing Block Grant funds to cover interest costs; the Federal interest in this project does not appear to be jeopordized by the plan changes being considered.

If the Redevelopment Agency and City take action with respect to this Project that results in a land proceeds deficit and the City were not to voluntarily provide local or Community Development Block Grant funds to cover the deficit, HUD could withhold up to 20% of the City's grant in any year for repayment of the outstanding loan and interest due for the Yerba Buena Center Urban Renewal Project.

COMMUNITY SERVICES

COMMUNITY SERVICES

1. WATER

Environmental Setting

The Yerba Buena Center area is served from the 140 million gallon capacity University Mound Reservoir, located in the Portola District north of McLaren Park. (The availability of water is discussed in the second part of the Resources assessment.) University Mound is so situated that water can flow to it by gravity from Crystal Springs, and from it by gravity throughout its entire service area along the lower elevations of the Financial District and the bayfront as far as the Marina.[1] System details are illustrated in Appendix D.

The Redevelopment Area receives water via a group of four feeder mains located beneath the street. Due to the "loop" system of interlocking mains fed from more than one source, water is available on any street.

The 30-inch Howard Street main between Third and Fourth Streets in the Redevelopment Area was relocated in 1973 into a 20-inch temporary detour on the south side of Howard Street in CB-3 to accommodate the previous design for an Exhibit Hall for Yerba Buena Center. This will have to be replaced with a permanent 30-inch steel main again beneath Howard Street. All other mains are under the streets.[1] (Footnotes are located at the end of the Community Services assessment.)

Impacts

The temporary 20-inch diameter steel main which is detoured to the south of Howard Street in CB-3 will have to be replaced under Howard Street by a permanent 30-inch diameter steel feeder main. Since the temporary main is more fragile than a permanent one, if conventional excavation techniques were used in YBC development, the temporary main would have to be replaced before any excavations could be done at the north end of CB-3.[2]

Water lines are removed or separated from the main lines and capped when a street (such as Minna or Natoma Street in CB-2) is abandoned. All other remaining mains are located beneath city streets; no further relocations would be necessary. According to the San Francisco Water Department,[2] Yerba Buena Center is one of the areas in San Francisco best supplied with water mains; water is available from every street. The six-inch main serving the center of SB-2 might have to be replaced with an eight-inch main to provide an adequate water supply to the TODCO housing development proposed for that site. This cannot be determined until architectural plans and Fire Department requirements are prepared for the building.[2]

Mitigation

As noted above, the entire Yerba Buena Center redevelopment area is fully supplied with water mains. No mitigation is necessary to assure adequate delivery of water.

SEWERS AND SEWERAGE

Environmental Setting

San Francisco sewage is treated at three treatment plants: Richmond-Sunset, Southeast and North Point. The system collects both rainfall runoff through the storm drains and the sewage from the City's residential, industrial and business areas. Due to the combined sewers/storm drains, the system cannot effectively handle all of the wastewater produced during storms. When the rainfall exceeds 0.02 inches per hour, the capacity of the treatment plants is exceeded and untreated waste water flows directly into San Francisco Bay and the Pacific Ocean. On the average, approximately 37 billion gallons of sewage (average dry-weather flow) are produced in the City annually. During periods of rainfall, an additional 4.4 billion gallons of wastewater on the average flows into the system each year from roof and area drains as well as 4.4 billion gallons of street runoff. Of the total 46 billion gallons, six billion gallons flow untreated into the Ocean and Bay.[1]

Because of health and environmental hazards created by the release of untreated sewage into the surrounding waters, on December 21, 1967 the City was ordered by State of California Regional Water Quality Control Board Resolution No. 67-74 to prepare a sewerage Master Plan, pursuant to the State Water Quality Act (the Porter-Cologne Act) and the Federal Water Pollution Control Act.[2] An overall plan for wastewater management initiated in 1966 and completed in 1971, is now evolving as environmental and engineering information is developed for implementation of elements of the plan. For further information about the Wastewater Master Plan, relevant environmental documents may be consulted at the Bureau of Sanitary Engineering, the Office of Wastewater Management, or the Office of Environmental Review of the Department of City Planning.

Wastewater from the Redevelopment Area is now treated at the North Point Plant; the eight-foot diameter, concrete North Point main runs through the Area (see Appendix D). The North Point Water Pollution Control Plant offers primary treatment supplemented with chemical addition for assisting coagulation and sedimentation. This treatment process removes approximately 50 percent of the pollutants.[3] As implemention of the Wastewater Management Plan proceeds, sewage from the Area would then be routed by 1982 through the transport/storage mains and via the channel St. Pump Station and the Crossdown Force Main to the expanded Southeast Treatment Plant.[1]

Two major relocations of the North Point main have taken place in the vicinity. In 1970, to accommodate the construction of BART, the section of the North Point Main going northwest under Second Street and northeast under Market Street to Sansome Street was rerouted to go from Second Street east on Stevenson Street and north on Ecker Street to Sansome Street.[4] The 2,500 foot section of the North Point main, previously under Howard and Second Streets, was realigned under Fourth Street and Mission Street to Second Street in 1973 to accommodate an earlier design for a below-grade Exhibit Hall in Blocks CB-2 and CB-3 which would have extended under Howard Street.[5]

The total amount of sewage generated in the Area may be estimated from the water consumption. San Francisco Water Department records show that an average of 0.132 mgd (million gallons per day) were used in the Yerba Buena Center area during 1976-1977. As little water is used there for landscaping, 100 percent of this is assumed for estimating purposes to be discharged into the sewers.[6] This is 0.13 percent of the total annual City sewage production of 37 billion gallons and 0.22 percent of the 22 billion gallons treated anually at the North Point Plant.

Impacts

Relocation of the eight-foot-diameter North Point main was completed in 1972 to accommodate the earlier two-block design for the convention center. No other city sewer mains will have to be constructed or relocated to serve the designated or permitted uses proposed for Yerba Buena Center.[6] (See Appendix D for locations of mains.)

The sewer currently existing under a section of the proposed pedestrian concourse on CB-1 will not have to be removed. The sewers that lie in CB-2 in what were Minna and Natoma Streets will have to be abandoned or removed, if buildings were to be constructed over them. On the other hand, if no buildings were constructed over them in such a manner as to cause their removal or abandonment, they could be used by the "permitted use", the recreation/entertainment park.

In CB-3, sewers exist under what were Tehama and Clementina Streets. These will be removed during the excavation for the convention Center. All other mains are under the streets.[6]

Sewerage

It is assumed for purposes of estimation that 100% of YBC water consumption, other than that used for irrigation of park and concourse landscaping, would be discharged into the sewers as liquid waste.[6]

The Redevelopment Area currently produces 0.124 million gallons of liquid wastes per day (mgd). This is 0.12 percent of the citywide average daily sewage production of 102.2 mgd. As early as 1981, after completion of the buildings now under construction and those committed for construction, the area would contribute an estimated 0.229 mgd, or 0.22 percent of the city's average dry-weather flow, with the convention center as noted below.

Average Dry-Weather Sewage Flows (MGD) Produced by Yerba Buena Center

	Existing Uses*	Committed Uses	Designated Uses	Total
1981	0.17	0.044	0.014	0.229
1988	0.17	0.07	1.24	1.48

* Includes buildings now under construction.

During construction of the convention center, the site would be dewatered from the present level of the water table at -2 feet[7] to a level of -25 to -30 feet and the water would be discharged into the combined storm drain/sewer system.[8] Dewatering would continue for approximately two years, at which time the water level would again be allowed to rise to the -2 foot level. A pump would be used to keep the water table from rising above this level for the life of the building.[9] Disposition of pumped water has not been determined, but will be resolved by the City Department of Public Works.

Until the Southeast Water Pollution Control Plant expansion is finished in mid-1982, sewage from Yerba Buena Center will receive primary treatment at the North Point Water Pollution Control Plant. The total completed development, by 1981 including existing and committed uses, would not produce more than 0.39 percent of the average daily dry weather flow of the North Point Plant; with this addition, the total dry-weather flow would remain within the plant's effective dry-weather design capacity. Any development would, however, add to the Plant's overflow problem during wet weather. This impact would continue until operation of the expanded Southeast Plant begins in 1982.

1988

By completion of all development in 1988, all dry-weather flows from Yerba Buena Center will receive secondary treatment at the expanded Southeast Water Pollution Control Plant, in compliance with the San Francisco Wastewater Management Program; the North Point Plant may have been converted to an interim wet-weather facility. Generally, sewage from the area north of Howard Street in Yerba Buena Center will be routed through the North Point Pumping Station, the Channel Street Transport/Storage System and via the channel Pumping Station and Crosstown Force Main to the Southeast Plant. Sewage from south of Howard Street will go directly to the expanded plant through the Channel Pumping Station and crosstown Force Main which will go into operation when the expanded Southeast Plant is put on line.[10] The expanded Southeast Water Pollution Control Plant is expected to receive average dry-weather flows of 85 mgd.[11] The total dry-weather flows generated under full designated development or with any or all of the permitted uses is not expected to tax the capacity of the expanded plant, which will have a peak capacity of 140 mgd and additional shock capacity in the transport/storage system.[11]

It should be noted that higher peak flows relative to overage flows could be expected due to the intermittant intensity of convention center use.

Recreation/Entertainment Park and other "Permitted" Uses

Weekend peaks in sewage generation would be higher when weekend recreation/ entertainment park use coincides with use of the convention center. There would be a decrease in wet-weather runoff due to absorption of rain by the landscaped areas of the recreation/entertainment park in CB-2 and CB-3. This would alleviate some of the shock loads on the storm drain system during rain storms. Replacement of the recreation/entertainment park by a conventional public park, would enhance this effect, because a lesser square footage would be covered by buildings and other impervious surfaces.

Should the Redevelopment Agency select all of the "permitted" housing sites and public parking garage, replacing some office, commercial and light industrial space, sewerage generation would not differ significantly from that shown for the designated uses.

Mitigation

- The Redevelopment Agency intends to require that all developers install low-flow toilets, urinals, taps, and showerheads to reduce the total liquid wastes discharged into the sewers.[12]

- The Redevelopment Agency will use a drip irrigation system and drought-resistant landscape materials in the park area in CB-3 (and, if selected CB-2) to reduce the use of water for irrigation and concomitant runoff into the storm drains.[13]

- Discharge of dewatering wastes from construction sites into the sewers must conform to the Industrial Waste Ordinance. The quality of the water will be determined and the cost of treating the wastewater (based on the water quality) will be negotiated by the city's Bureau of Sanitary Engineering and the contractor. The cost is to be borne by the contractor.[14] Dewatering for construction under the current schedule would continue for a period of approximately two years beginning in February of 1979. The greatest amount would be discharged into the sewers between February and April, 1979.[15] Dewatering would be begun during the dry season to reduce shock loads during rain storms; if delaying the schedule were not economical, dewatering during and immediately after storms could be avoided.

- As dewatering for installation of the transport/storage sewer main system along the Embarcadero will be occurring during the period of YBC construction, all dewatering wastes during excavation and construction of the convention center would be discharged into the North Point main to avoid an overloading of the Fourth Street pumping station. Turner Construction Company has agreed to comply with the recommendations of the Bureau of Sanitary Engineering in this regard.[13]

- The convention center engineers are considering means of dewatering after the convention center is completed. Any dewatering done to maintain the water table at no more than -2 feet could be used for landscape irrigation and not discharged into the storm drain system. A well permit and periodic testing of the water would be required by the Department of Public Health; a back-flow preventer to prevent pumped water from entering the domestic supply would have to be installed.[16] The salinity of the water is low enough to permit its use for landscape irrigation, but other future tests would be required to determine its suitability. Use of the water would be dependent on the quality of the water and the ability of the structure to withstand changes in the level of water table. This recommendation is under consideration by the convention center engineers.[17]

ELECTRICITY, GAS AND STEAM

Environmental Setting

The Pacific Gas and Electric Company furnishes electricity, natural gas and steam power in the City of San Francisco.

Electricity is now provided to the Yerba Buena Center Area through a predominantly underground network supplied by the 225 MVA (million volt ampere) capacity Mission Street Substation at 66 - Eighth Street at Mission Street 1/. Electrical distribution facilities in the vicinity of the proposed Yerba Buena Center include:

Location	Electrical Distribution Facilities
Mission Street	12 KV, underground
Howard Street	None (except street lighting)
Folsom Street	12 KV, underground
Harrison Street	12 KV, overhead between 2nd and 5th Street and underground between 5th and 7th Street
Third Street	34 KV and 12 KV, both underground
Fourth Street	12 KV, underground

Electrical distribution lines would be extended into the Project Area by P.G.& E. to meet Project power requirements. Power to larger buildings, such as the proposed Convention Center, would be furnished at 4160 volts. Power to smaller buildings and housing would be furnished at 120/208 volts 2/.

Natural gas is brought in via San Jose and the East Bay and distributed through a local high-pressure (24 PSI) grid system in the Yerba Buena Center Area. Pacific Gas and Electric has stated that, under Rule No. 19 approved by the Public Utilities Commission, no service can be provided for new, non-residential customers whose natural gas requirements exceed 50,000 cubic feet per day and could be met by alternate fuels (such as oil), due to the apparent limited availability of natural gas. Natural gas would be provided for open-fire uses, such as in restaurants, where no acceptable alternate fuel can be used. Residential customers are not affected 1/.

The steam-generating plants serve a limited area of downtown San Francisco. Station T is located at Fifth and Stevenson Streets. The original Station S is on Geary Street. The distribution system extends to Fourth and Mission Streets, but there are no customers within the boundaries of YBC at the present time. Requests for steam power would be considered on an individual basis, but the expense to the consumer of extending the distribution lines would probably be prohibitive 1/.

Impacts

In 1972-73, Pacific Gas and Electric Company rerouted the electric and gas lines which were under Howard Street; no further relocations are anticipated 3/. However, as Yerba Buena Center is an "underground district," the aerial power lines on Clara, Shipley and Clementina Streets west of Fourth Street will have to be removed as soon as undergrounding work is scheduled by the City and County of San Francisco.

Forecasts now indicate that sources of natural gas will continue to decline 1/. No service will be permitted for new, non-residential customers in Yerba Buena Center whose requirements would be greater than 50,000 cubic feet of gas per day, providing that requirement can be met with non-gaseous fuels (such as oil) 4/. The gas distribution system is capable of serving the needs of Yerba Buena Center at full development 1/.

The capacity to serve the demand for electrical power under full development exists in the Pacific Gas and Electric system as a whole 1/. However, the Mission Street Substation, which serves the Yerba Buena area, is now being used to capacity. Further development would require a transfer to the 136 MVA-capacity Embarcadero Substation at 405 Folsom Street and expansion of its capacity to 600 MVA. Provision for expansion to 600 MVA-capacity currently exists (space for the additional transformers, switchgear, buswork, etc.) 1/. The proposed recreation/entertainment park will add approximately 900,000 to 990,000 KWH of additional electrical load to the electrical distribution system 5/. Much of this additional electrical load is for decorative incandescent lighting which uses approximately three times as much energy (watts) per lumen of illumination as fluorescent lighting used in commercial and office spaces. In addition, considerable electrical power will be required for

operation of the various amusement rides in the park. In view of the need to expand existing electrical facilities to serve Yerba Buena Center, the forecast for reductions in the supply of natural gas used to generate electricity, and the fact that the total energy requirements at the source (steam generating plant) is approximately three times the electrical energy consumption on-site, the decorative incandescent lighting required for the proposed recreation/entertainment park will have a negative impact on the electrical services to the Project Area when compared to the more efficient alternative uses for the electrical power.

Mitigation

The Local Planning Agency is to be encouraged by HUD communication to consider installation of total energy systems for generation of electrical energy for large buildings within Yerba Buena Center, and for recovery of waste heat for use in heating those buildings, thereby minimizing the impact on the existing electical and natural gas distribution systems 6/.

Use of decorative incandescent lighting in the proposed recreation/entertainment park is discouraged due to the amount of electrical energy required for incandescent lighting compared to fluorescent lighting (three-times as much wattage per lumen of light produced).

SOLID WASTE

Environmental Setting

Domestic solid wastes are collected by the Golden Gate Disposal Company, a private firm, and trucked to the Transfer Station at Tunnel and Beatty Avenues in North Brisbane. They are then transported, as are all domestic solid wastes from the City of San Francisco, to the Mountain View landfill site at Mountain View Shoreline Regional Park in Santa Clara County. The current contract provides for the use of the landfill site until October 31, 1983.[1] In November, 1975, when the contract was signed, space for 4.8 million tons of solid wastes was guaranteed for San Francisco's use. Space for approximately 3.0 million tons remains available at the landfill site.[2] Plans for expansion of the landfill site are being prepared and all permits have been secured, but the final design is not yet complete and the exact capacity of the expanded site has not been determined.[2]

545,600 tons of domestic solid wastes, exclusive of sewage, were produced in the City in 1975.[1] Golden Gate Disposal Company has roughly estimated the amount of solid wastes now generated in the Yerba Buena Center Area to be between four and six tons per day.[3] At this rate, Yerba Buena is responsible for approximately 0.3 percent of the City's annual domestic solid waste production. Pick-ups are made six days per week, with the frequency of service at a particular location dependent on the size and amount of wastes produced. Most of the waste is containerized.

Some refuse is dumped on the vacant lots on the site, but this is limited by the surrounding fences and preponderance of apartment hotels providing paid collection for tenants.

Impacts

At full development, including the existing and committed uses, the entire Yerba Buena Redevelopment Area is expected to produce approximately 3.3 percent of the 662,100 tons of domestic solid waste projected for San Francisco by 1990 in the San Francisco Solid Waste Management Plan (S.F. Department of Public Works, 1975). The office space planned would produce 60 percent of the impact. See table below. Refer to Appendix F-3 for solid-waste generation calculations.

SOLID WASTE PRODUCTION (TONS PER YEAR) IN YERBA BUENA CENTER: 1988

EXISTING AND UNDER CONSTRUCTION	COMMITTED USES	DESIGNATED USES	TOTAL	TOTAL AS A PERCENTAGE OF TOTAL S.F. SOLID WASTE * %
2,290	442	18,850	21,600	3.3

* Estimated San Francisco domestic solid-waste production in 1990 would be 662,100 tons per year, according to the San Francisco Solid Waste Management Plan.

Variant or "Permitted" use

Insofar as the generation of solid waste is concerned, the choice of one or all of the five variant "permitted" use sites for housing instead of their designated uses would not substantially increase the total production of solid waste as a percentage of the total San Francisco solid waste. The same can be said for the "permitted" variant of shifting the hotel site and/or the construction of a public parking garage on the northwest corner of EB-3 instead of the designated office and retail use. However, the development of a recreation/entertainment park, rather than a public park, could increase the designated impact by some 2,000 tons per year. This would increase the total solid waste production by Yerba Buena Center Redevelopment Area to nearly 3.6 percent of the total estimated San Francisco solid waste production in 1990.

The full development of Yerba Buena Center would occur after the expiration of the contract for use of the Mountain View landfill site; the exact site which would be in use at that time is not known. Securing disposal sites is a problem for San Francisco; the wastes generated by Yerba Buena Center would be expected to shorten the life of the city landfill site.

Excavation Materials

Excavation materials from construction of the convention center would begin to be produced in 1979. An estimated 630,000 cubic yards will be removed, although 25 percent of this material will be put back into the foundations[4]. Some of the excavated soils, but no more than 50,000 cubic yards, could be used on top of the convention center for landscaping, if the soil were determined to be suitable by the landscape architect. The remaining 420,000 cubic yards of material would be hauled away from the site to be dumped or sold as fill.[4] A private (not municipal) fill site would be used; final arrangements will be made by the excavating contractor. The East Bay Regional Park District has expressed an interest in obtaining fill for three sites in the East Bay.[5]

The potential exists for spillage along the haul route. Each contractor would be responsible for the removal of any materials spilled. It is not anticipated that problems from spillage would occur generally along the haul routes; there could be some spillage in the area near each site where the trucks make a turn to get onto the street.[4]

Construction Debris

An estimated 25,000 cubic yards of construction debris, mostly from the finishing of the interior, would be produced by 1981 during the construction of the convention center.[4] A contractor would be hired to make the arrangements for disposal of the debris in a private (not municipal) landfill.[4] All of the construction debris for Yerba Buena Center would be handled in a similar manner.

Mitigation

- The Redevelopment Agency intends to require that all refuse, including that from housing developments, be placed in metal dumpster containers to facilitate pick-up.[6]

- Although the compacting of wastes would use energy, compacting and recycling would lessen the amount of landfill space required to serve Yerba Buena Center; a room would be provided in the convention center for solid-waste compaction and the storage of recyclable wastes. The provision of similar rooms would be encouraged by the Redevelopment Agency for buildings which would be constructed by private developers.[6]

- Turner Construction Company is making arrangements to stockpile, on or near the site, the soils excavated for the convention center undergrounding, which would then be used in constructing the foundation of the convention center and for rooftop park development. This stockpiling would save landfill space and the energy which would have been required to transport the soils to and from a landfill.[6]

COMMUNICATIONS

Environmental Setting

Telephone service is provided by Pacific Telephone and Telegraph Company. Most of the telephone cables have been undergrounded beneath the streets, but some lines in the vicinity are still on poles and will remain so until the City schedules its undergrounding. Lines on Howard Street between Third and Fourth Streets remain in a temporary detour made to accommodate the SUPERCEDED below-grade design of the Exhibit Hall.

Several private firms offer courier and messenger services. They employ foot and bicycle messengers in the local area and Financial District and deliver by truck to the airports and throughout the Bay Area.[2]

The United States Postal Service has divided the Redevelopment Area into portions of three zip code areas: 94103, 94105, and 94107. Mail delivery is supervised from the Main Post Office at Seventh and Mission Streets, Station E at 460 Brannan Street, and the Rincon Annex at 111 Spear Streets, respectively, as well as from several Postal Service mailrooms in private buildings. Other post offices in the vicinity are located at 137 New Montgomery and in the Emporium at 835 Market Street. All mail from collection boxes and post offices is taken to the Rincon Annex for distribution.[3]

Impacts

Effect on Telephone Service

Yerba Buena Center is in what has been designated an "underground district"; remaining aerial telephone facilities would be placed underground on Clementina, Shipley and Clara Streets west of Fourth Street when so scheduled by the City.[4] All telephone lines installed in the future would be placed underground in City streets. The lines in the

temporary detour on the south side of Howard Street between Third and Fourth Streets would be reestablished in Howard Street. The Redevelopment Agency has requested that this work be completed as soon after January 1, 1978 as possible.[4] Pacific Telephone and Telegraph Company has stated that it would be able to provide service at any of the levels required by either the designated or variant (permitted) uses as described in Part IV Project Description whenever required.

Effect on Courier and Delivery Services

By 1981 the convention center would place demands on the courier services in the Yerba Buena Center area. The requirements of the center would be irregular, peaking during periods of heavy convention use.

One courier service has stated that, through the expansion of staff and equipment, it would be able to serve the Yerba Buena Center at the full level of development proposed for 1988.[2] As many of the messengers use bicycles, theft and accidents involving pedestrians and unattended bicycles might occur. Delivery trucks and vans could also cause congestion.

Full development of offices and retail space by 1988 would require the expansion of existing services. The impact of the variant or "permitted" recreation/entertainment park would require little service and the variant location of the hotel would merley change the location, not the intensity of required services. Neither the variant housing sites nor the development of the public parking garage is expected to significantly change the level of courier and delivery services needed nor the existing firms ability to provide such services.

Effect on the United States Postal Service

The Postal Service would continue to provide service to the Redevelopment Area under zip code areas 94103, 94105 and 94107. The demands for mail delivery and pickup at any level of development under either the designated or variant (permitted) uses would be met as provided by law. Mail pickups would occur from collection boxes placed throughout Yerba Buena Center by the Postal Service. Deliveries would be made from the post offices serving the three zip code areas. Mail delivery would also be possible from Postal Service mailrooms located within private buildings, subject to the discretion of the Postal Service and to compliance with the regulations governing such mailrooms.[6]

Mitigation

- The Redevelopment Agency intends to require the installation of bicycle racks near the convention center and office building entrances for use by messengers.[7]

- The specification for service driveways and space for loading for delivery trucks and vans has been described in the Redevelopment Plan (p. 10). Deliveries to the convention center would be restricted to a dock area and the drop-off zone on Folsom Street.[7]

- The designation of yellow-curb delivery zones near convention center, offices, light industry and downtown support buildings would alleviate congestion caused by delivery vehicles. Such designations would require the approval of the Traffic Survey Unit of the San Francisco Police Department and the Police Commission and are granted after analysis of the frequency of deliveries, the need for parking, and local traffic congestion.[8]

POLICE DEPARTMENT SERVICES

Environmental Setting

Officers of the San Francisco Police Department patrol the Yerba Buena Center Redevelopment Area from the Southern Station, located in the Hall of Justice at 850 Bryant Street. Ninety-nine officers, about 10 percent of the Patrol Division, were stationed at the Southern Station in 1976.[1] Five squad cars cover the area south of Market Street as far south as 16th Street; the response time to the Area is five minutes.[2] No YBC patrols are made on foot.

In 1976, 3,550 police reports of all types were filed for the four statistical reporting areas which include YBC;[3] these included 2,590 major crimes (Part I crimes as recorded by the FBI).[4] There were 11.2 major crimes per acre in that year as compared to 2.6 per acre for the City as a whole. Statistical reporting area 606, which includes the portion of the Redevelopment Area west of Fourth Street and north of Howard Street, had the most crimes in the City in 1976; robberies, assaults and thefts are concentrated there. The crime frequency decreases in the areas to the east and south of Reporting Area 606. Thefts and burglaries are the two crimes most frequently committed in the rest of YBC. The rate of auto theft is also higher than elsewhere in San Francisco due to the large number of unattended parking lots currently distributed over YBC. Auto thefts occur most often in the mornings and late afternoons while other crimes are most often committed in the afternoons and evenings.[6] The crime frequency decreases in the areas to the east and south of reporting area 606.

Impacts

Development in any form in the redevelopment area would have an effect on the types and frequencies of crimes which would occur there. The exact effect cannot be determined, since it would depend on detailed plans for design and construction of all components and the mix of people who would be using them. The rate of auto theft would be reduced by the elimination of most of the unattended parking lots now distributed throughout YBC. Construction sites would be subject to vandalism of equipment and theft of tools and materials. Crimes against persons, such as strong-arm and armed robbery and aggravated assault, which are

currently concentrated in the areas closest to Market and Sixth Streets, would be expected to decrease due to the increased pedestrian traffic and development of areas that are now vacant and are used as sleeping places by transients.[7] The rate of burglary and theft in offices, retail stores, and other businesses would depend on the internal security, such as alarm systems and security guards, provided in each building.

Proposed to be completed by 1981, the convention center itself would probably not require any additional police manpower due to its internal security measures and the convention center guard force (see Mitigation, below). Pilferage and theft would be the major problems anticipated. According to the Chief of Security of the Los Angeles Convention Center[8], a facility similar in size to the one proposed for YBC, the Los Angeles Convention Center resulted in a lower rate of crime in the local area and no extra police officers were needed. A special police detail for pickpockets might be needed during heavy convention activiity, however.[8]

The convention center designated passive park, if landscaped as planned in an open manner for visibility, could be patrolled adequately by existing squad cars and would not be expected to atrract a violent criminal element. Some activities now common in Union Square, such as panhandling, drug trafficking, and public drunkenness might occur in the park; a police task force, similar to the one patrolling Union Square, might be needed to control this. This task force could also be used to discourage solicitation for prostitution which might occur due to the proximity of the proposed hotel.[9]

Some traffic control officers would be required when high convention center pedestrian traffic coincides with peak-hour vehicular traffic.

The "permitted" recreation/entertainment park would require less Police Department protection than the public park since an internal, private security force would patrol the grounds and would be responsible for security while the recreation/entertainment park was open.

If the park were enclosed and an admission fee charged for entrance to the grounds, few crimes against persons would be expected because casual pedestrians would be excluded from the area after closing time. The buildings within the grounds, however, would be more vulnerable to burglary and vandalism since the police on patrol would not be able to see into the area.[7]

If the grounds of the recreation/entertainment park were not enclosed and an admission were charged only for specific buildings, areas, and entertainment events, pedestrians would be likely to cross through the area after closing time and would be potential victims. The park would be more visible to City police patrolling in cars; burglaries of the buildings would be discouraged.[7]

The amount of police service required for any or all of the "permitted" housing developments would depend on the types of internal security systems provided in the buildings to discourage burglaries. The "permitted housing will probably be market rate and patrol elements are developed to assure prospective tenants good security. The Police Department has studied the YBC housing plan changes and has indicated that no new police stations or additional patrolmen will be necessary for market rate housing.

Mitigation

- All construction sites must be fenced under Federal Occupational Safety and Health Administration regulations; the Redevelopment Agency suggests that security guards be required at night at all construction sites to protect materials and equipment from vandalism and theft.[10] Turner Construction Company intends to have security guards for the convention center site during all hours when work is not being done.[11]

- The Redevelopment Agency intends to require security systems or bonded security guards in all subsidized housing developments to reduce burglaries and assaults and would recommend them for all other (i.e., market-rate) housing.[10]

- The Redevelopment Agency would suggest that security alarm systems be installed in all office buildings, retail-commercial establishments, and light industrial and downtown support service buildings to avoid burglaries and to reduce the demand for police services; this installation would be the responsibility of the individual developer.[10]

- Street lighting, especially on side streets, could be designed for pedestrians as well as vehicles. The Department of Public Works has delayed upgrading the lighting in YBC and would prepare lighting plans designed for pedestrian and vehicular safety once street disruption, connected with YBC construction, were finished. Any such plans would require City P.U.C. approval.[12]

Convention Center

The following security measures have been designed into the convention center:[13]

- Vehicular and pedestrian access and egress would be controlled; all those making deliveries and pickups would pass through a security check. The Exhibit Hall would be open to the general public only for the pruchase of tickets to consumer shows.

- Each division of the Exhibit Hall floor would be capable of being completely locked.

- The Security Office would be able to monitor all exhibit-floor exit doors. An alarm would sound if one of the doors were opened.
- During shows, guards would be stationed at the exit doors.

In addition to the measures included in the convention center design:

- Traffic control officers could handle traffic corners of CB-3 when heavy convention center pedestrian traffic coincides with rush hour. At the San Francisco Civic Auditorium (Brooks Hall), the hiring of such officers is done by and at the discretion of the user.[14]

- The Redevelopment Agency intends to require that the convention center park be landscaped for visibility and well-lighted at night.[10]

Recreation/Entertainment Park

- The Redevelopment Agency would suggest that the internal security force at the park be a Patrol Special, formed of off-duty, special police officers who have almost as much authority as regular officers. This force could be required to patrol after closing hours, as well as while the park is in operation, to decreate the possibility of burglaries or assults. However, the selection of a security guard force would be the responsibility of the park developer.[10]

- If the recreation/entertainment park grounds were to be unfenced, the use of shrubbery could be avoided and landscaping could be designed for visibility. The park could be well-lighted, even after closing. The Redevelopment Agency intends to submit the finished landscaping plan to the Police Department for review.[10]

FIRE DEPARTMENT SERVICES

Environmental Setting

Five stations of the San Francisco Fire Department serve the Redevelopment Area. These are stations Numbers 1, 8, 13, 27, and 35. Station #35 at 676 Howard Street is located within the Yerba Buena Center area and Station #1 at 416 Jessie is just one block west of it. Response time is three minutes or less.

Between 1973 and 1976, the Yerba Buena Center area averaged two to three major (greater than one-alarm) fires per year; between 1969 and 1972, it averaged five major fires per year. This is low in comparison to the rest of the City. Resuscitation and paramedical services were required an average of four times annually from 1973 to 1976.

According to Chief Rose, the water supply is adequate for current fire-fighting needs.

Impacts

The fire protection requirements of either the designated uses or any and all of the variant or "permitted" uses can be met by the San Francisco Fire Department without any increase in firemen, inspectors, or equipment, because the level of service now offered is consistent with full urban development. No high-pressure lines,[2] operated by the Fire Department, would have to be relocated or replaced and none would have to be installed.[3]

Of particular concern to the Fire Department is the design of the convention center. Because of its below-grade location and unique use, it would not be completely covered by the provisions of the Building Code. Discussions are now proceeding between the architects of the center and the Fire Marshal as to the internal fire protection safeguards which would be incorporated into the design. These mitigating measures are discussed in Appendix I and under Mitigation below. The final agreement would be submitted to the San Francisco Board of Examiners for approval. Containment of a fire in the convention center would not be a problem, but the speical conditions of large crowds below-grade concern the Fire Department. The exact number of persons permitted in the building at one time has not yet been determined, but it would be approximately 27,000. The Fire Department would like to ensure that the convention center and its staff would be self-sufficient with respect to fire protection for several hours in case of city-wide disaster or emergency conditions which might prevent immediate Fire Department response.

The site is well protected externally by a 16-inch high-pressure water main circling the block on Fourth, Folsom and Third Streets. No alterations would be required.

Other buildings planned under designated uses would be adequately protected by compliance with Building and Fire Code requirements.[3]

The selection of one or all of the variant "permitted" housing sites would not present any special problems; the same can be said for the shifting of the hotel or the construction of the public parking garage on the northwest corner of EB-3.

The recreation/entertainment park would present two problems to the Fire Department. Adequate access for fire protection vehicles would be required, as would emergency egress for patrons.

Mitigation

Convention center specifics are addressed in Appendix I. The convention center would have fire alarm, sprinkler, standpipe, smoke removal and communications systems. It would be built of fire-resistant materials and would have an emergency power supply and water reservoir. There

would be more exits from the Exhibit Hall than are required by the Building Code; some of these would be ramps. A capacity crowd of approximately 27,000 people would be able to exit the convention center in about 9 minutes in an emergency; for 6 1/2 minutes of this time they would be within a two-hour fire-rated enclosure.[5]

The Redevelopment Agency has agreed to require the following mitigation measures recommended by the San Francisco Fire Department.[6]

- For patrons of the recreation/entertainment park, provide emergency egress on all streets through one-way gates or doors; and

- Provide fire lanes and gates within the recreation/entertainment park for fire vehicle access according to Fire Department requirements.

SCHOOLS

Environmental Setting

The Filipino Education Center is located on the site of the former Lincoln Elementary School on Harrison Street, west of Fourth Street and adjacent to the redevelopment area. It is operated by the San Francisco Unified School District and offers bilingual education in grades Kindergarten through Six to children drawn citywide.

All primary students (grades Kindergarten-3) living in the Yerba Buena Center vicinity are bused to Douglas School at 4235-19th Street. Intermediate students (grades 4-6) living east of Fourth Street are bused to Daniel Webster School at 465 Missouri Street, while those to the west walk to Bessie Carmichael School at Harrison and Russ Streets. Older students attend Everett Junior High School and Mission High School.[1] No major changes to the above patterns are anticipated should the proposed "Redesign School Plan" be implemented as proposed YBC.

In 1964, St. Patrick's School, serving the parish which includes the Redevelopment Area, closed for lack of students. The nearest parochial school is now St. Joseph's at 2204 Tenth Street near Howard Street. St. Joseph's has the capacity to accommodate more than the 194 students presently enrolled.[2]

No school-age children are known to be living in the Yerba Buena Center Redevelopment Area.

The new Downtown Center of the San Francisco Community College District is under construction at Fourth and Mission Streets. The Center is planned to open in 1978 and to have a capacity of 10,000 students per

day.[3] Students from the downtown business area as well as nearby residents are anticipated due to the emphasis on courses in job development and business skills. The City College and San Francisco State University will participate with the Community College Center in the courses at the Downtown Center as a cooperative venture.[4]

Impacts

Effect on the Downtown Community College Center. The Downtown Center is expected to draw students citywide, especially from people working in the financial and retail districts, for its business and career-oriented classes. The Center has been planned to respond to the needs of the downtown community, and the mix of residential and office development selected for YBC would have a direct effect on the types of courses offered. Classes could also be given in housing developments or office buildings under an outreach program, if rooms were made available.[3]

1981. The 90,800 square feet of office and retail-commercial space completed or committed for development by 1981 would have no impact on enrollment at the Downtown Center. Should rooms be made available at the convention center, however, it would be possible for classes or seminars to be given by Downtown Center staff.[3]

1988. Students drawn primarily from employees in the planned office and retail-commercial space would increase the enrollment at the Downtown Center, particularly in business classes. Industrial employees and local residents would also provide a pool from which some students would be drawn. The Downtown Center was designed, in part, to serve the needs of Yerba Buena Center after development; courses on the apparel industry have already been planned to serve employees of the apparel mart. As 27,500 people would be employed in Yerba Buena Center following development of the designated uses and approximately 80 percent of these would be office workers, there would be an increase in course enrollment.

Variant or "Permitted" Uses

The recreation/entertainment park would not contribute significantly to enrollment at the Downtown Center. Should one or more of the "permitted" housing sites be developed, more courses geared to the needs of residents would be offered.[3]

Effect on the Public and Parochial School System

Few school age children would be expected to live in the 50 market-rate dwelling units planned atop the apparel mart under the designated uses. If there are any, most would attend private schools. Subsidized housing for the elderly would produce no school age children. Development of all the designated uses would, therefore, have no impact on public or parochial school system. If the maximum of 900 dwelling units were selected under the "permitted" uses and they were all market rate units, eight to ten public school children might live in the YBC Redevelopment Area.

SCHOOL-AGE CHILDREN LIVING IN YERBA BUENA CENTER BY 1988

Designated Uses	Additional Dwelling Units		Public School Children				Parochial School Children				Total Additional Children Public & Parochial School	
	Subsidized Family	Market Rate	Subsidized Family** Elem.	Subsidized Family** Jr & Sr High	Market Rate*** Elem.	Market Rate*** Jr & Sr High	Subsidized Family** Elem.	Subsidized Family** Jr & Sr High	Market Rate*** Elem.	Market Rate*** Jr & Sr High	Elem.	Jr & Sr High
Variant #1	900		225	210	-	-	75	69	-	-	300	279
Variant #2		900	-	-	3	7	-	-	1	1	4	5

Variant #1 = 900 units subsidized family housing
Variant #2 = 900 units market rate housing.

* Variant #1 and Variant #2 demonstrate the extreme ranges of all housing being either subsidized family or market rate to show worst-case impact. As noted in Part IV, final development of variants could be up to 900 units with the majority probably being market rate.

** Based on Western Addition subsidized family housing.

*** Based on Golden Gateway Apartments.

1/ No children are known to be living in the redevelopment area at the present time.

The San Francisco Unified School District could accommodate the additional school children expected by 1988 under maximum impact of any or all variant or permitted uses (the maximum impact possibility) without the construction or expansion of schools.[5] Variant #1 would produce approximately 435 public school children (See Table). Students would attend the same schools that children in the vicinity now attend. None of the District's special schools, such as the Filipino Education Center within the Redevelopment Area, would be overtaxed by additional students.[5]

The Department of Education of the Archdiocese of San Francisco currently has a total school enrollment below its capacity.[6] The parochial school system could accommodate and would benefit from increased enrollment of approximately 144 students under the maximum impact of variant #1. The pattern of enrollment is no longer predominantly by parish, so children would be expected to attend schools throughout the City.[6]

Mitigation

The existing school systems, both public and parochial, as well as the Downtown Center of the San Francisco Community College Centers, indicate they have the ability to accommodate any additonal school children or adults expected as a result of the full development of the designated uses or maximum impact variant or "permitted" uses without the construction or expansion of schools. As a consequence, no mitigating actions are required or recommended.

PARKS AND RECREATION

Environmental Setting

There are no parks or mini-parks in the Yerba Buena Center Redevelopment Area; none are currently planned there by the San Francisco Recreation and Park Department. The nearest parks are the 0.2 acre Langton and Howard Mini-Park, built in 1971, and the 0.9 acre South Park, one of the oldest in the City, which is in the center of South Park Avenue between Second and Third Streets and Brannan and Bryant Streets.[1]

The Recreation and Open Space Element of the Comprehensive Plan[2] and the General Manager's Report on the Open Space Acquisition and Park Renovation Fund for Fiscal Year 1977-78[3] designate the South-of-Market area as a high-need neighborhood for new parks and recreation improvements; the Open Space Committee of San Francisco, appointed by the Board of Supervisors as mandated under Proposition J in 1974, has allocated $1,000,000 for the acquisition of a park site in the South-of-Market area outside of YBC to serve the needs of community residents. The exact location of this park has not yet been determined.4

Impacts

A park acquisition is planned to the west of the Redevelopment area under the Open Space Program acquisition to relieve the need of South-of-Market residents for park space. The Recreation and Park Department would be involved in the design and maintenance of the public park and convention center park.

Under development of the designated uses which includes a possible park, the park area above the convention center would be scheduled for completion by 1981. If any structural elements were to be incorporated into the landscaping, specialized maintenance equipment would have to be acquired by the Recreation and Park Department. This park would require daily maintenance, similar to the demands of Union Square. By 1988 the convention center park would be used for lunch and recreation breaks by employees of the offices and apparel mart of Yerba Buena Center and use during lunch breaks by workers from the Financial District, would grow. The convention center park would not lessen the need for the planned Open Space Program acquisition in the vicinity, because it would be used primarily by employees and residents of developments proposed within YBC.[5]

If the variant recreation/entertainment park is developed, the Recreation and Park Department would not be involved in the maintenance of this privately developed facility. Should the recreation/entertainment park have enclosed grounds, the absence of any public park space would produce increased use of the nearby Open Space Program park planned for the use of community residents. Both the additional employees and residents of YBC would add to the use of the planned park.[5] Should the recreation/entertainment park have grounds which would be freely open to the public, it could be used by community residents. The degree and nature of use would depend on the developer's design of the park and the number of community-oriented facilities, such as crafts centers or playgrounds, provided within it.

Mitigation

- The architect has agreed with the Agency to eliminate or concentrate above-ground structural elements of the convention center[5], wherever possible, to reduce the amount of hand labor required in park maintenance and thus lower the maintenance costs.[6]

- To avoid overuse of the planned Open Space Program park, the Redevelopment Agency is considering reserving a portion of CB-2 or CB-3 as a public park to meet the demands for park space created by YBC development. An alterntive design for the recreation/ entertainment park, in which no admission would be charged for entrance onto the grounds, would satisfy this need and is under consideration by the Redevelopment Agency.[7] The final decision on the form of the recreation/entertainment park would be based upon a development agreement negotiated by a private developer and the Redevelopment Agency.[7]

The Redevelopment Agency would consult with the Recreation and Park Department as development proceeds and would:

- Involve Recreation and Park Department staff at the earliest possible time in all phases of park and pedestrian concourse design; and

- Incorporate ease of maintenance as one design criterion for parks and the pedestrian concourse.[7]

It is uncertain whether the Recreation and Park Department or the Department of Public Works would be involved in the maintenance of the pedestrian concourse.

MEDICAL

Environmental Setting

The South-of-Market Health Center at 551 Minna Street is the primary provider of outpatient care for the Redevelopment Area and vicinity. Funded by a grant from the Department of Health, Education and Welfare as a part of the San Francisco General Outpatient Department it charges for services on a sliding scale based on the ability to pay. The Health Center provides general outpatient medical care, but does not provide emergency service. Fifteen-hundred to 1,600 patients are served by the Health Center each month; approximately 40 percent of these patients are families and 30 percent are elderly.[1] The South-of-Market Health Center is especially well-used by families.[2]

Also serving the area is the Mental Health Clinic Number Four outpatient facility at 450 Sixth Street and the San Francisco Verneral Disease Clinic at 250 Fourth Street.

San Francisco General approximately three miles from YBC, is the nearest hospital, although Veteran's Hospital and the Public Health Service Hospital are also used. Emergencies are generally served at Mission Emergency of San Francisco General Hospital. City ambulance service response time in the South-of-Market area has averaged four to six minutes[3] although response times of one-half hour to one hour have been reported by South-of-Market residents.[2] Ambulance service is also provided for all kinds of emergencies by the Fire Department. One rescue unit is housed at the fire station at 416 Jessie Street,[4] and response time to YBC is about three minutes.[5]

Impacts

The Yerba Buena Center area has general, urban medical services. Deficiencies in the existing services are discussed in the South of Market Planning Task Force Draft Report of July 18, 1977. As most of the residents of the housing proposed for development would be relocated from other areas of San Francisco, their impact on local medical services would involve a decrease in demand in other areas of the City.

Businesses and industrial development would have an impact on emergency services which would be provided by San Francisco General Hospital (Mission Emergency) rather than relying on the local clinic, most employees would be expected to have physicians near their places of residence.

The elderly, such as the residents of the proposed 602 units of TODCO housing, customarily have private doctors because they receive medical assistance, and few would be expected to use the South-of-Market Health Center.[6] Based on the similar Los Angeles Convention Center, an estimated 12 medical emergencies, mostly heart attacks, would occur each year at the Yerba Buena convention center.[7] These would receive first aid from a convention center First Aid Station nurse and then be treated at San Francisco General Hospital.

Few of the elderly residents of the proposed 602 units of TODCO housing would use the South-of-Market Health Center. City homemaker and visiting nurses would be required by some of the elderly. No further impact, except for a level of medical emergencies consistent with urban business uses, would be expected under the full development of the designated uses.

Should one or all of the variant "permitted" housing use sites be developed into subsidized housing, the residents would use Health Center facilities. The Center staff could be expanded as necessary and at the present location, to meet this demand.[8] Residents of any market-rate housing as well as business and industry employees would generally use private doctors.

No further impact, except for emergencies, would be expected under the development of any of the other variant or permitted uses.

<u>Mitigation</u>

<u>Convention Center</u>

- A 600 sq ft. first-aid room is planned to be included in the convention center. The first-aid room would be staffed by a nurse employed by the convention center. First-aid kits will be placed in the building and a mobile emergency cart will be available to the nurse and security guards to go to the scene of an accident or illness.[9]

<u>Residential Variant</u>

The high concentration of housing for the elderly would produce a need in Yerba Buena Center for transportation for the elderly, particularly those not fully ambulatory, to doctor's offices and other medical

facilities. A shuttle or van service for residents could be provided by TODCO for this purpose.

FOOTNOTES

Water

1 George Y. Nakagaki, Assistant Manager, City Distribution Division of San Francisco Water Department, personal interview, July 15, 1977.

2 John E. Kenck, Manager, City Distribution Division of San Francisco Water Department, personal interview, August 12, 1977.

Sewers

1 Figures supplied by Arthur H. Brandow, Administrative Engineer, San Francisco Department of Public Works, Bureau of Engineering, personal interview, July 15, 1977.

2 T. Russell Almdale/Barbara W. Sahm, Wastewater Management Program, San Francisco, letter dated August 18, 1977 and telecom August 17, 1977.

3. J. Crafts Superitendent of the Bureau of Water Pollution Control, Department of Public Works, telephone communication, November 3, 1977.

4 Norham Lee, Investigation Section, Department of Public Works, Bureau of Sanitary Engineering, personal interview, July 15, 1977.

5 City and County of San Francisco, Department of Public Works, Bureau of Engineering, July 18, 1972, Yerba Buena Area Sewer Relocation EIS.

6 Jafilim M. Deta Cruz, P.E., Section Chief, Bureau of Sanitary Engineering, San Francisco, August 12, 1977.

7 San Francisco Datum (zero feet) is 8.69 feet above new sea level.

8 Flows are currently being estimated in a study by Dames and Moore, for the YBC Coordinator.

9 Richard Dorais, Turner Construction Company, telephone conversation, August 31, 1977.

10 Dryweather sewage flows will go to the Southeast Plant via the North Point Plant from all of the area north of Howard Street and from those blocks west of Fourth Street and east of Third Street which front on Howard, as well as from the portion of EB-3 which fronts on Second Street. The sewage from the rest of the site will go via the Channel Pumping Station. (See the San Francisco Wastewater Management Plan EIR/EIS, May, 1974, for additional information.)

11 Don Birrer, Senior Civil Engineer, Transport-Storage, Wastewater Flow Control Division, Bureau of Sanitary Engineering. personal interview, August 29, 1977.

12 Thomas Conrad, Chief of Planning, Housing and Programming, San Francisco Redevelopment Agency, telephone communication, September 2, 1977.

13 Jean La Marre, Project Director for Yerba Buena Center, Turner Construction Company, telephone communication, September 2, 1977.

14 J. Crafts, Superintendent of the Bureau of Water Pollution Control, Department of Public Works, telephone communication, October 28, 1977.

15 R. Dorais, Turner Construction Company, telephone communication, December 14, 1977.

16 P. Schwabacher, Health Inspector, Department of Public Health, telephone communication, November 15, 1977.

Electricity, Steam and Gas

1 Telephone conversation between C. H. Kenaston (HUD) and Robert McKillican (PG&E) of December 2, 1977.

2 Telephone conversation between C. H. Kenaston (HUD) and Gerald Tyson (PG&E Commercial/Industrial Supervisor) on November 22, 1977.

3 Telephone conversation between C. H. Kenaston (HUD) and Lindbergh Low (Engineer, San Francisco Redevelopment Agency) on December 2, 1977.

4 Pacific Gas and Electric Company Rule Number 19. Residential customers are exempted. Synthetic natural gas, liquefied natural gas and liquefied petroleum gas are specifically excluded as alternate fuels. That is, a customer would not be forced to rely on one of these fuels, if it were the only feasible alternative to natural gas.

5 Memorandum from Richard Gryziec (Architect/Planner) to the San Francisco Redevelopment Agency dated August 5, 1977.

6 A description of total energy systems is provided in the "Mitigating Measures" section of the Resources (Energy) assessment of this EIS.

Solid Waste

1 Stanford Snoek, Engineer, Department of Public Works, Office of the City Engineer, telephone communication, July 13, 1977.

2 Richard Haughey, Shoreline Park Project Engineer, Public Works Department, City of Mountain View, telephone communication, August 1, 1977.

3 Fiore Garbarino, Office Manager, Golden Gate Disposal Company, telephone communication, July 13 and August 4, 1977.

4 Jean LaMarre Project Director for Yerba Buena Center, Turner Construction Company, telephone conversation, July 14, 1977, August 16, 1977, and August 18, 1977.

5 These potential sites are: San Leandro Bay Regional Shoreline (Oakland); Oyster Bay Regional Shoreline (Port Richmond); George Miller, Jr. Regional Shoreline (San Leandro). FEIR's have been completed and adopted on all three sites and have been reviewed by BCDC. The convention center fill would not be used to fill the Bay, but would be used to raise the elevation of areas already existing in the parks. (D. Harms, Assistant Chief, East Bay Regional Parks, telephone communication, November 17, 1977.)

6 Richard Dorais, Turner Construction Company, telephone communication, August 31, 1977.

Communications

1 Paul Bray, Facilities Engineer, Pacific Telephone and Telegraph, telephone communication, July 15, 1977.

2 Susan Hossall, Sales and Operations Manager, U.S. Messenger and Delivery telephone communication, July 19, 1977; John Driscoll, Rocket Messenger and Air Courier Service, telephone communication, July 18, 1977.

3 Jack Smith, Foreman of Delivery, U. S. Postal Service, telephone communications, July 15, 1977 and July 21, 1977.

4 R. J. Teglia, District Manager, Engineering, Pacific Telephone and Telegraph Company, letter to ESA dated July 29, 1977.

6 John Smith, Foreman of Delivery, United States Postal Service, telephone conversation, July 21, 1977.

7 Thomas Conrad, Chief of Planning, Housing and Programming, San Francisco Redevelopment Agency, telephone communication, September 20, 1977.

8. Sgt. L. Etherington, Traffic Survey Unit, Traffic Division, San Francisco Police Department, telephone communication, November 15, 1977.

Police Services

1 San Francisco Police Department Planning and Research Division, Annual Statistical Report, 1976, July 1, 1977.

2 San Francisco Department of City Planning in cooperation with the San Francisco Police Department, Police Facilities: A Proposal for Citizen Review, Community Facilities Element of the Comprehensive Plan of San Francisco, April 1974.

3 Statistical reporting areas #606, #608, #618, and #620, bordered by Sixth, Harrison, Second and Market Streets.

4 Part I crimes as tabulated in the F.B.I.: Murder, manslaughter, rape, robbery, aggravated assult, burglury, larceny, and auto theft.

5 Sergent Victor Wode, Research and Development Division, San Francisco Police Department, telephone communication, August 3, 1977.

6 Statistical information from Lt. E. Hartman, Officer-in-Charge, Planning and Research Division, San Francisco Police Department, letter to ESA dated September 26, 1977.

7 Inspector D. Ewing, Burglary Division, San Francisco Police Department, telephone communication, October 21, 1977.

8 E. Brown, Chief of Security, Los Angeles Convention Center, telephone communication, September 20, 1977.

9 Sergeant E. Fowlie, Union Square Squad, San Francisco Police Department, telephone communication, October 14, 1977.

10 T. Conrad, Chief of Planning, Housing and Programming, San Francisco Redevelopment Agency, telephone communication November 3, 1977.

11 R. Dorais, Turner Construction Company, telephone communication, November 3, 1977.

12 A. Tanner, Senior Electrical Engineer, Department of Public Works, telephone communication, November 15, 1977.

13 MBT Associates, 1977, Program: Yerba Buena Center.

14 J. Balzer, Manager, San Francisco Civic Auditorium, telephone communication, December 14, 1977.

Fire Services

1 All information for the environmental setting section was supplied by Chief Rober Rose, Planning and Research Department, San Francisco Fire Department in a personal interview with ESA, August 11, 1977.

2 The high-pressure water supply system is reserved for the use of the Fire Department for fighting fires, and is completely independent of the domestic water distribution system.

3 Gilbert Bendix, Superintendent of Water Supply and Engineering, San Francisco Fire Department, telephone communication, August 15, 1977.

4 Chief Charles W. Corli, Fire Marshal, San Francisco Fire Department, personal interview with ESA, August 12, 1977.

5 Chief W. Graham, Fire Marshal, San Francisco Fire Department, telephone communication, December 14, 1977.

6 Thomas Conrad, Chief of Planning, Housing and Programming, San Francisco Redevelopment Agency. Telephone communication, September 2, 1977. (According to the Fire Marshal, specific requirements cannot be detailed until the plans for the recreation/entertainment park are prepared and reviewed by the Fire Department.)

Schools

1 Peter Der and Richard Mesta, Statistics Department, San Francisco Unified School District, telephone communications, July 13 and July 18, 1977.

2 Mrs. Antoinette Canepa, Statistics Department, Archdiocese of San Francisco Department of Education, letter to ESA, July 19, 1977.

3 Dr. Carolyn S. Biesiadecki, Director, Downtown Community College Center, letter to ESA, dated July 22, 1977.

4 Larry Brousaal, Director of the San Francisco Community College Centers, telephone communication, July 13, 1977.

5 Lawrence Jacobsen, Educational Needs Analyst, Facilities Planning Department, San Francisco Unified School District, telephone communication, August 5, 1977.

6 Msgr. Pierre Dumaine, Director of Archdiocese of San Francisco Department of Education.

Parks and Recreation

1 Timothy Lillyquist, Administrative Staff Assistant, San Francisco Recreation and Park Department, letter to ESA dated July 29, 1977.

2 San Francisco Department of City Planning, 1973, The Recreation and Open Space Element of the Comprehensive Plan of San Francisco.

3 San Francisco Recreation and Park Department, 1977, General Manager's Report, Open Space Acquisition and Park Renovation Fund: Fiscal Year 1977-78.

4 M. Greenlaw, Coordinator, Open Space Program, Recreation and Park Department, telephone communication, July 21, 1977.

5 Thomas Malloy, Assistant General Manager, San Francisco Recreation and Park Department, personal interview with ESA, August 16, 1977.

6 J. Rogers, Superintendnet of Parks, Squares, and Outside Facilities, Recreation and Park Department, telephone communication, November 18, 1977.

7 T. Conrad, Chief, Planning, Housing and Programming, San Francisco Redevelopment Agency, telephone communications, September 2, 1977 and December 14, 1977.

Medical Services

1 Dr. William Shore, Director, South-of-Market Health Center, telephone communication, September 9, 1977.

2 South-of-Market Planning Task Force, Draft Report, July 18, 1977.

3 D. Carey, Assistant Superintendant, San Francisco City Ambulance Service, telephone communication, November 2, 1977.

4 Chief Charles W. Carli, Fire Marshall, San Francisco Fire Department, telephone communication, August 15, 1977.

5 Chief R. Rose, Planning and Research Division, San Francisco Fire Department, telephone communication, November 2, 1977.

6 Dr. W. Shore, Director, South-of-Market Health Center, telephone communication, September 9, 1977. Use by the elderly of private doctors was corroborated by J. Thomas, Manager, Clementina Towers, telephone communication, September 20, 1977.

7 E. Brown, Chief of Security, Los Angeles Convention Center, telephone communication, September 20, 1977.

8 MBT Associates, Program: Yerba Buena Center, April 15, 1977.

9 Paula Collins, Assistant Coordinator, Yerba Buena Convention Center, telephone communication, September 21, 1977.

NOISE

This assessment will discuss the extent and nature of the acoustical environment in the vicinity of the proposed Yerba Buena Center, and will develop proposed methods for reducing the adverse impacts of this acoustical environment. Specific topics covered by this assessment include:

- Definition, Characteristics and Description of Noise,
- HUD Noise Standards,
- Environmental Setting,
- Impacts,
- Mitigating Measures

Definition, Characteristics and Description of Noise

Noise is most often described as "unwanted sound." 1/ Sounds are all around us and certain sounds to one are music and to others objectionable noise. People are becoming increasingly conscious of sound and increasingly concerned about noise. About seven percent have no objections to almost any sound; therefore, the great majority of people react adversely to noise and find attenuation of that noise to be beneficial.

Adverse effects of excessive noise include: 2/

- Physiological effects, both temporary (e.g., startle reactions and temporary hearing threshold shifts) and enduring (e.g., permanent hearing damage or the cumulative physiological effects of prolonged sleep loss).
- Behaviorial effects involving interference with ongoing activities such as speech, learning, TV-watching, or the performance of various tasks.
- Subjective effects, described by such words as "annoyance," "nuisance," "dissatisfaction," "disturbance," etc., as a result of behaviorial and physiological effects.

Noise exhibits many characteristics including:

- Intensity (loudness),
- Temporal pattern (duration and time of occurrence),
- Spectral content (frequency as characterized by the pitch of the sound),
- Pure tone content.

The intensity, or loudness, is an indication of the amount of sound energy emitted by the noise sources, and is important because excessive sound energy can cause temporary or permanent damage to hearing. Noise temporal patterns include sounds occurring during nighttime hours which may result in sleep disturbance. The spectral content of noise is important in that the human ear is much less sensitive to low-frequency sound than high-frequency sound. Acoustical barriers, such as the walls, roofs and ceilings of houses, provide more attenuation of high-frequency noise than low-frequency noise. Pure tones are perceived to be significantly louder than broadbased or random sound of the same intensity.

A variety of types of descriptors are currently used to describe the characteristics of noise. These include:

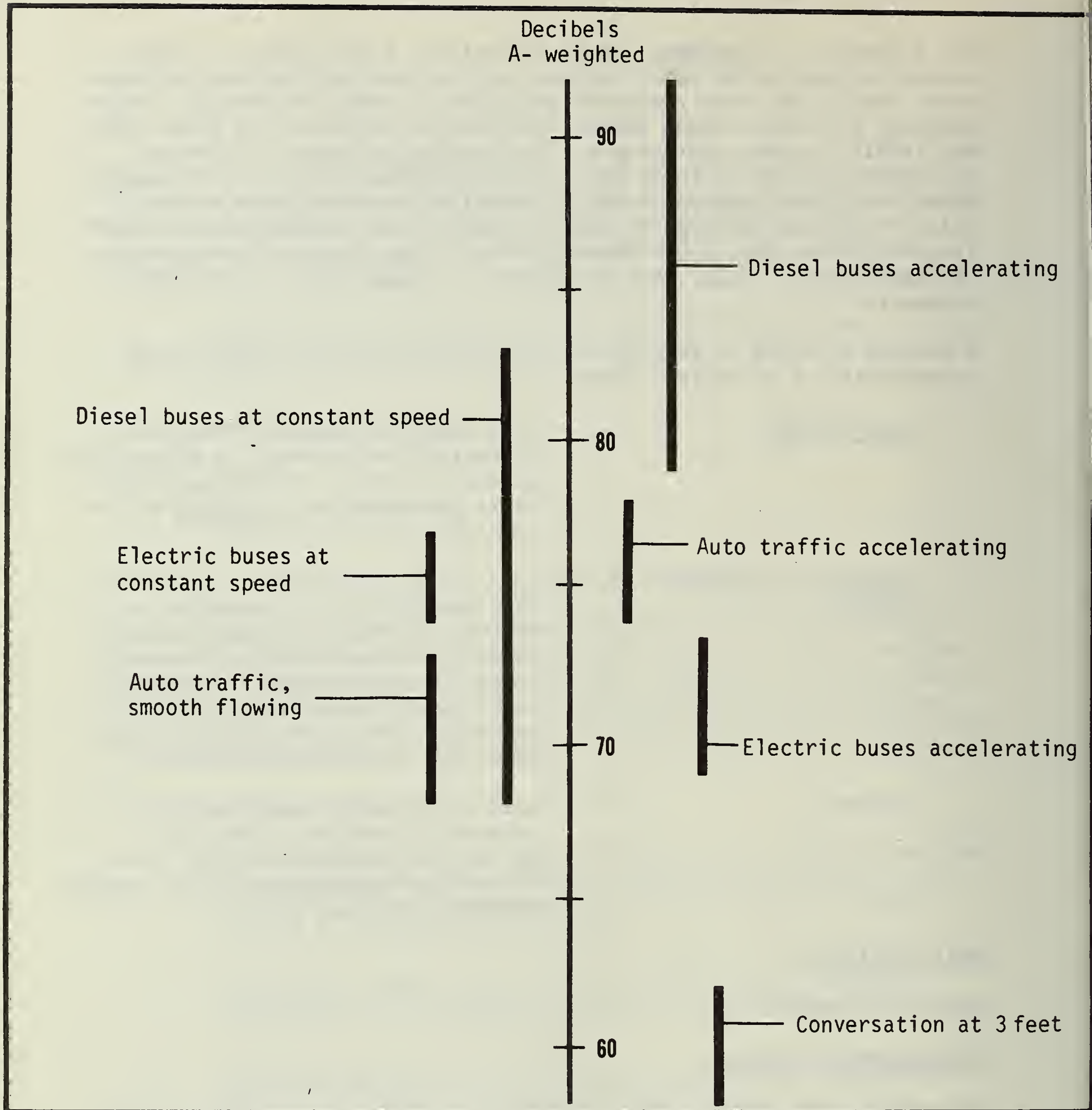
Decibels(dB)	-	This descriptor measures the sound intensity, or loudness, at a particular instant in time. An increase of 10 dB is perceived as a doubling of the loudness.
A-weighted decibels (dB(A))	-	This descriptor is a variation of decibels in that it measures sound intensity except that low frequency sounds (below 100 hertz) are attenuated as much as 20 to 40 dB to approximate the low response of the human ear to these frequencies.
24-Hour L_{33}	-	This is the dB(A) level that is exceeded 33 percent of the time during a 24-hour period, and is one of two descriptors used in the current HUD noise standard 3/.

Noise Criteria

Refer to Appendix H.

Environmental Setting

To quantify the existing noise environment within YBC, a noise survey4/ was conducted between 8 June and 8 August 1977. Previous studies done in the area covered only a few locations (A.D. Little, Inc., 1973; U. S. Department of Housing and Urban Development, 1974). To supplement these data, 25 noise monitoring locations were selected for the new survey to establish the noise climate adequately. The locations were selected with emphasis on monitoring the noise environment in the vicinity of existing housing and throughout the area where future housing develop-



Typical Levels of Predominant Noise Sources in Yerba Buena Center.
(Measured at 25' from the center line of the near lane);
Conversation level shown for comparison

TYPICAL YBC
NOISE LEVELS

ment may occur. The locations are shown in the following Figure. As shown, periodic samples were taken at 19 locations during the morning, afternoon and evening hours. Continuous 24-hour measurements of L_{33} were taken at six locations5/ for comparison to the HUD noise standards. Detailed data from the survey is presented in Appendix G.

The noise in the Redevelopment Area is dominated by traffic on local streets. Buses, trucks and motorcycles cause the peak levels, while the background noise is controlled by automobiles. In the southeastern portion of YBC, noise from the I-280 freeway is noticeable. The opposite figure displays typical levels of the predominant individual noise sources in the YBC area.

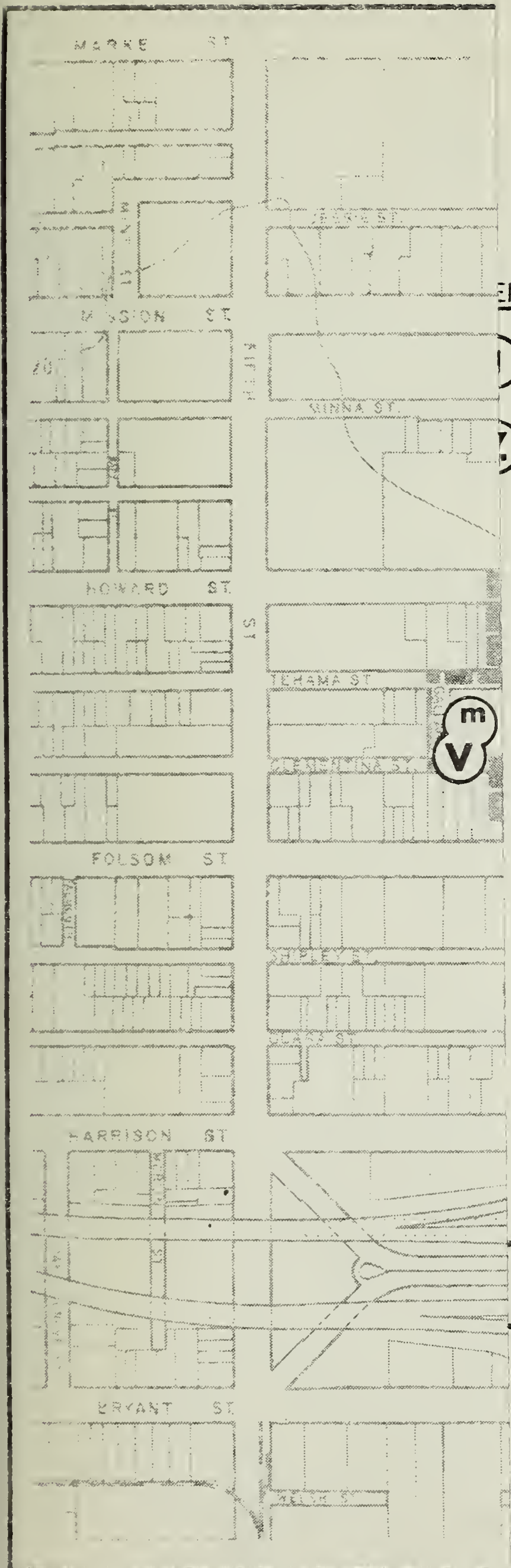
To show where in YBC current noise levels in the open exceed the HUD criteria for exterior noise for housing, the subsequent figure has been prepared. This map shows in black the area where the existing 24-hour L_{33} equals or exceeds 65 dB(A). On the map, the lines delineating the blocks are the property lines; the curb lines are out 10 feet (the nominal width of a sidewalk in this area).6/ Because of the small scale of this map, the actual locations of the contours are difficult to see; for this reason, the table below has been included. The table shows the distance to the existing 24-hour L_{33} = 65 dB(A) contour from the curb line along the major streets in YBC. Day-to-day variations in the noise level could cause the contour to shift about 10 feet in either direction.

DISTANCE FROM CURB LINE TO EXISTING 24-HOUR L_{33} = 65 dB(A) CONTOUR

Street	Distance in Feet
Mission Street	40
Howard Street	40
Folsom Street	20
Harrison Street	20
Third Street	20
Fourth Street	20

Impacts

Construction noise impact due to hauling will include noise from as many as 80 haul trucks on hours (from 9 AM to 4PM) in and out of YBC during the estimated five months of excavation for the convention center. This would be the maximum period of construction traffic and would, therefore, also be the period of maximum construction truck traffic noise impact. The exact locations of the excavation disposal sites are not yet known; therefore, the noise impacts associated with construction truck traffic will be discussed in general terms.



END

Lower case letter: periodic measurement sites

Upper case letter: 24 hour measurement sites

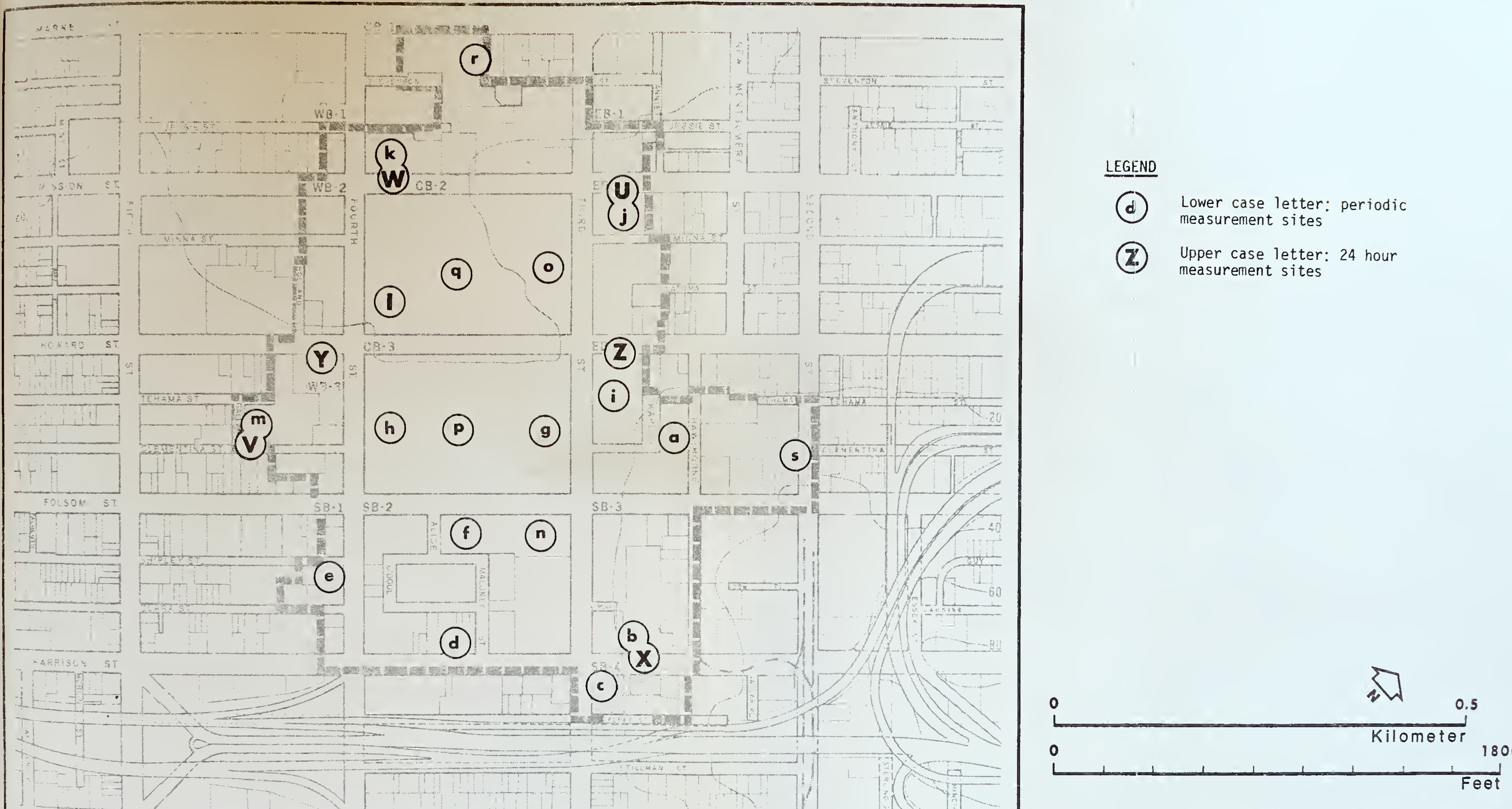
0.5

Kilometer

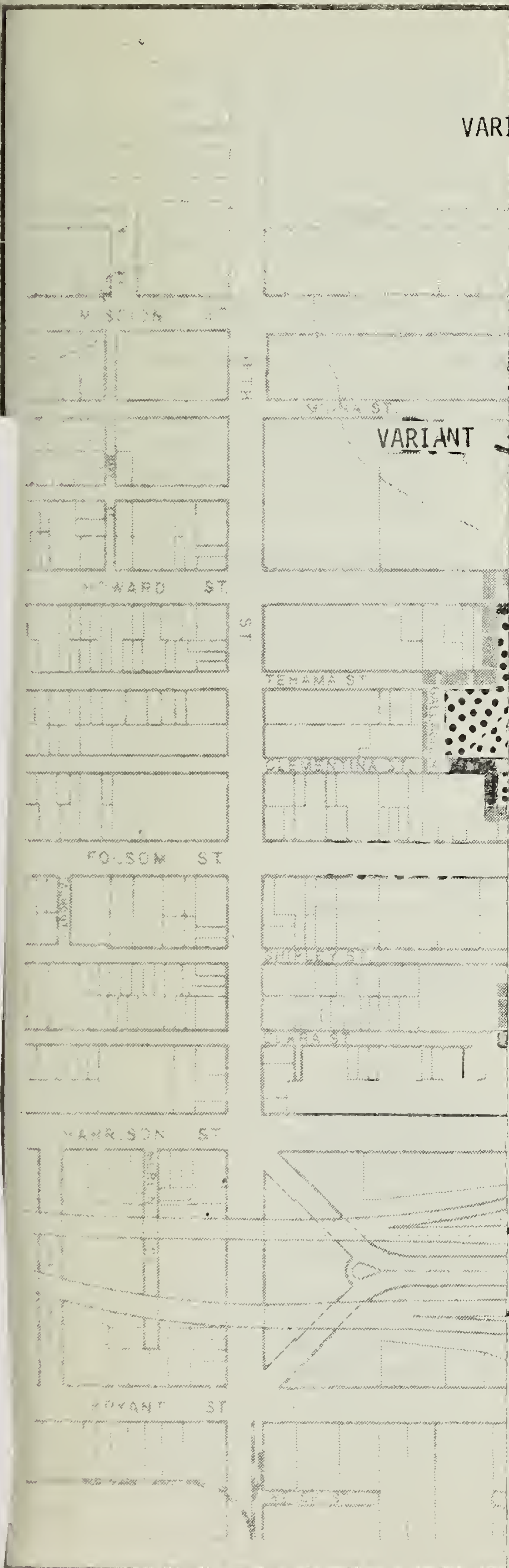
1800

Feet

NOISE MEASUREMENT LOCATIONS



NOISE MEASUREMENT LOCATIONS

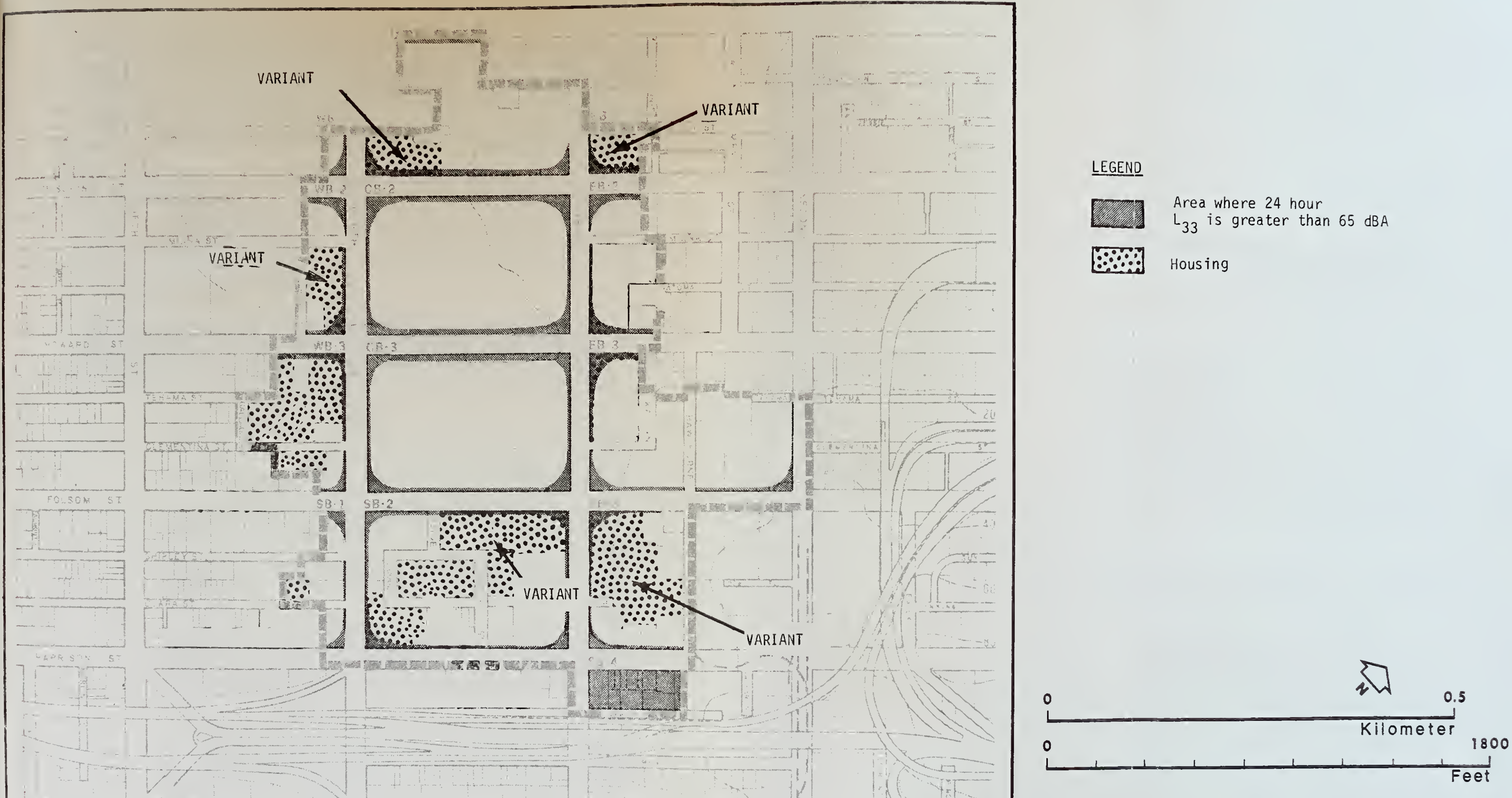


Area where 24 hour L_{33} is greater than 65 dBA

Housing

0.5
Kilometer
1800
Feet

NOISE
COMPATIBILITY
(HUD)



NOISE COMPATIBILITY (HUD)

Because the streets into and out of YBC that may be used as haul routes are one-way streets (Third, Fourth, Folsom, and Howard), there might be a maximum construction truck traffic volume of 40 trucks an hour on a given street. The anticipated noise increase during the hauling of excavation material would, therefore, be about 3-11 dB(A) along Howard Street, and about 7-15 dB(A) along Third, Fourth or Folsom Streets. A 10 dB(A) increase represents about a doubling in (perceived) loudness.

The noise impact of construction truck traffic outside YBC would depend on the location of the disposal sites and the associated routes, the land uses along the routes, and the existing noise levels along the routes. If only one disposal site were in use at a time, the noise levels associated with the construction truck traffic would be about the same as in YBC itself regardless of location, except that on two-way streets levels would be about 3 dB(A) greater due to the doubling in truck traffic volume.

Construction activities other than hauling would temporarily increase noise levels near the noise-generating sources. The noise levels caused by construction activities would fluctuate measurably, depending on the following variables:

- the phase of construction;
- the duration;
- the type(s) of equipment used during each phase;
- the noise emission of a particular item of equipment during its "noisy" operation;
- the proportion of a day during which the equipment would be operating in its "noisy" mode, described as the "usage factor";
- the mobility of the equipment, e.g., the noise source might be a stationary air compressor or a self-propelled back-hoe; the mobility of the source is interdependent with the usage factor in determining the impact upon a fixed receptor (such as a residence);
- the distance between the noise source and the receptor;
- the noise-propagation characteristics of the path between the noise source and receptor (e.g., shielding by a barrier would result in a reduced noise level at the receptor).

During construction, adherence to the provisions of the San Francisco Noise Ordinance would result in less than about 3 dB(A) increase (a 3 dB(A) increase is barely perceptible) at existing housing in the area, when the construction is located across the street from housing. This is because the noise emission levels of the construction equipment would be at about the same noise levels as those produced by daytime traffic in the area. When construction is taking place in lots immediately adjacent to housing, greater impact can be expected. Implusive (pulse-type) noise due to riveting, pounding, banging, etc., would result in a 10-20 dB(A) instantaneous change in noise levels in the closest housing units, producing a startle reaction. While people would probably become accustomed to this, it would be annoying nonetheless.

Project noise impact in YBC due to the full implementation of Yerba Buena Center (1988, operations after construction) is expected to be barely perceptible, for the following reasons. The increases in traffic associated with the Project would increase the L_{33} noise level by less than 2 dB(A) in 1980 and less than 3 dB(A) in 1988 7/. The effect of variant or permitted uses in changing this impact will be negligible because the changes in traffic volume would be small compared to the total for the Project. A rise of 10 dB(A) would represent a doubling of perceived noise, whereas a rise of 3 dB(A) is at about the threshold of perceived change and corresponds to a doubling of traffic volume.

The effect of a 3 dB(A) will increase in the existing noise environment due to project-related traffic would be to increase the distance from the curb line to the 24-hour L_{33} = 65 dB(A) contour from those values in The previous Table to the revised values in the Table below.

DISTANCE FROM CURB LINE TO 24-HOUR L_{33} = 65 dB(A)
CONTOUR AT FULL-DEVELOPMENT (1988)*

Street	Distance in Feet 8/
Mission Street	105
Howard Street	112
Folsom Street	68
Harrison Street	70
Third Street	68
Fourth Street	68

* Based on doubling of traffic volume due to Project impact.

Based on the revised location of the 24-hour L_{33} = 65 dB(A) contour lines from the above Table, there will be specific committed or designated housing locations within the Project Area where the HUD exterior and interior noise standards will be exceeded unless mitigating measures are employed. These locations are:

- Those portions of the elderly housing site (committed use) at the corner of 4th and Harrison Streets which front on either of those two streets;

- The Howard Street frontage of the housing site (designated use) that is located between Gallagher Street, Clementine Street and Howard Street, but is set back from 4th Street; and

- Those portions of the elderly housing site (committed use) at the corner of 4th and Howard Streets which front on either of those streets.

Specific variant or permitted housing locations within Yerba Buena Center where the HUD exterior and interior noise standards will be exceeded unless mitigating measures are employed are:

- Those portions of the sites at the corner of Folsom Street and 3rd Street in Blocks SB-2 and SB-3 which are within 68 feet of the curb of Folsom Street or within 68 feet of the curb of 3rd Street.

- Those portions of the site at the corner of 3rd and Mission Streets in Block EB-1 which are within 105 feet of the curb of Mission Street or within 68 feet of the curb of 3rd Street.

- Those portions of the site at the corner of 4th and Mission Streets in Block CB-1 which are within 105 feet of the curb of Mission Street or within 68 feet of the curb of 4th Street; and

- Those portions of the site at the corner of 4th and Howard Streets in Block WB-2 which are within 68 feet of the curb of 3rd Street or within 112 feet of the curb of Howard Street.

<u>Mitigation</u>

<u>Construction Noise</u>

Construction noise criteria and mitigation measures described in Appendix H will be enforced by the City and County of San Francisco, Director of Public Works.

<u>Post-Construction Noise Mitigation for Housing</u>

Mitigation of post-construction noise levels is required at the three <u>designated</u> housing locations and four <u>variant</u> housing locations described in the Impacts Section to assure compliance with noise standards in HUD Circular 1390.2. Physical methods to reduce noise impact can be grouped into four major categories: 9/

- Acoustical site planning;

- Acoustical architectural design;

- Acoustical construction; and

- Noise barriers

Acoustical site planning refers to placing a proposed development on a site such that maximum advantage is taken of acoustical isolation for both interior and exterior spaces. Acoustical site planning techniques include: 9/

- Placing as much distance as possible between the noise source (e.g., traffic on adjacent streets) and the noise sensitive activity;

- Placing noise compatible activities such as parking lots, open space, and commercial facilities, between the noise source and the sensitive activity;

- Using buildings as barriers;

- Orienting noise-sensitive buildings to face away from the noise source.

Acoustical architectural design incorporates noise-reducing concepts in the details of individual buildings. The areas of architectural concern include building height, room arrangement, window placement, and balcony and courtyard design. Bedrooms should normally be placed in the part of the building that is farthest from the noise source.

Acoustical construction is the treatment of the various parts of a building to reduce interior noise impacts. It includes the use of walls, windows, doors, ceilings and floors that have been treated to reduce sound transmission into a building.

Noise barriers can be erected between noise sources and noise-sensitive areas. Noise barriers include berms made of sloping mounds of earth, walls and fences constructed of a variety of materials, or combinations of these materials. Thick plantings of trees and shrubs provide a psychological benefit by screening out noise sources from view, but are not effective in reducing noise levels unless the depth and height of dense plantings exceeds that which is feasible in Yerba Buena Center.

The amount of noise reduction required is dependent upon the exterior noise level. Typical amounts of noise reduction that would be required to meet HUD interior and exterior noise standards at various exterior noise levels are shown in the table below:

TYPICAL NOISE REDUCTION REQUIREMENTS

Exterior Noise Level	Noise Reduction Required (dB(A))	
(24 HR. L_{33})	Interior (Bedroom) Spaces	Exterior Spaces
85	40	20
75	30	10
65	20	0
55	10	0
45	0	0

This table indicates that at an exterior noise level of L_{33}=65 dB(A), the HUD exterior noise standard will be met; however, 20 dB(A) of noise attenuation (reduction) to interior (bedroom) spaces is still required in dwelling units. The amount of attenuation required increases as the exterior noise level increases above L_{33}=65dB(A), or decreases as the noise level drops below L_{33}=65 dB(A).

Noise attenuation of approximately 12 dB(A) from outdoor to indoor can normally be achieved with windows openned for ventilation. If greater than 12 dB(A) of outdoor to indoor attenuation is needed, a means of providing mechancial ventilation of the building is normally required. It is possible in some cases, especially for higher floors, to obtain greater than 12 dB(A) of outdoor to indoor noise attenuation without requiring closed windows; i.e., window boxes, solid balconies, or other barriers which can obstruct line-of-sight to the noise source could achieve the required reduction if designed properly.

Noise reduction of 20 to 30 dB(A) from outdoor to indoor can normally be achieved with windows closed. The exact amount of reduction will depend up the types of wall construction, type of windows, and percentage of wall area that is window. Increased amounts of outdoor to indoor noise reduction can be achieved by using acoustically rated windows, smaller sized windows, or similar acoustical construction treatments of various parts of dwelling units.

It would be premature to specify detailed noise mitigation measures prior to design (or even preliminary design) of specific housing projects within YBC because mitigation is so inter-related with site planning and design of the dwelling units themselves. Therefore, HUD noise mitigation in this EIS will consist of specifying mandatory requirements which shall be included in the Land Disposition Agreement for the three designated housing sites and four variant housing sites described in the "Impacts" section. These mandatory requirements are:

- Sponsor/developer to submit an acoustical report for the project, including an acoustical design demonstrating the acoustical attenuation methods that will be used to assure compliance with interior 10/ and exterior 11/ noise standards in HUD Circular 1390.2.

- Approval by HUD of the above acoustical design is required prior to final approval of HUD subsidies or mortgage insurance for the housing project.

It is anticipated that mechanical ventilation of interior spaces will be required for all dwelling units facing major streets in YBC to permit the closing of windows for noise reduction. Acoustical designers/ engineers are encouraged to use innovative site planning which interposes buildings between the noise source (street) and noise-sensitive exterior areas. In general, detailed acoustical designs should explore all feasible means of noise reduction along the lines outlined earlier in this mitigation section.

Post-Construction Noise Mitigation for Non-Housing Areas

HUD noise criteria in HUD Circular 1390.2 do not apply to non-housing areas. Therefore, HUD does not consider it appropriate to specify mandatory noise mitigation measures for office spaces, commercial/retail, light-industrial, and other types of land use. It is recommended, but not mandatory, that the San Francisco Redevelopment Agency require mitigation measures that will result in the attainment of the HUD interior noise standard (L_{33}=45 dB(A)) in office areas of YBC. Mechanical ventilation of offices spaces will assure attainment of this standard in most cases.

The San Francisco Department of City Planning will review mitigation measures for non-housing areas to assure compliance with the San Francisco Noise Element criteria described in Appendix H.

Footnotes

1/ A Guide to Airborne, Impact and Structureborne Noise Control in Multifamily Dwellings, U. S. Department of Housing and Urban Development, Washington, D. C., page v.

2/ Aircraft Noise Impact, U. S. Department of Housing and Urban Development, Washington, D. C., page 36.

3/ HUD Circular 1390.2, Noise Abatement and Control, August, 1971.

4/ The noise survey was conducted by Charles M. Salter, Consultant in Acoustics, under contract to Environmental Science Associates, Foster City, California for use in the Environmental Impact Report (EIR) for Yerba Buena Center (YBC).

5/ Details of all measurements are presented in Appendix G. These include exact times at which measurements were taken, and descriptions of measurement sites.

6/ Except for Market Street, where the sidewalk width is 35 feet.

7/ The 3 dB(A) increase corresponds to a doubling of traffic volume.

8/ These revised distances from the curb to the L_{33} = 65 dB(A) contour correspond to a doubling of the effective distance from the noise line-source to the noise receptor; i.e., the effective distance for contour line locations in Table VII.H.2 are double the effective distance for contours in Table VII.H.1 in order to reduce the noise exposure from L_{33} = 68 dB(A) to L_{33} = 65 dB(A).

9/ Detailed discussions of these four categories are contained in the U.S. Department of Transportation (DOT) publication "The Audible Landscape: A Manual for Highway Noise and Land Use", August, 1976.

10/ The interior standard will be a mandatory requirement only for sleeping quarters; however, compliance with the interior standard for other interior areas of dwelling units, or interior areas of offices and commercial spaces, is encouraged.

11/ Applies only to noise sensitive exterior portions of the site which includes outdoor living areas such as private lawn areas, balconies large enough for furniture, patios, rest areas and private gardens. It does not apply to outdoor areas such as passive-open-space, parking lots or areas used for ingress and egress to living units.

RESOURCE USE

ENERGY RESOURCES

Development of the proposed Yerba Buena Center will result in additional consumption of energy due to increases in utility loads and increased use of gasoline and diesel fuel. Therefore, it is necessary to consider the impact of additional energy consumption on available energy sources, the adequacy of these energy sources to serve the increased demand, and finally, methods of conserving energy to reduce the project impact on energy sources.

Environmental Setting

Availability of electricity and natural gas for the Project area and adequacy of existing utility distribution systems was discussed with a representative of Pacific Gas and Electric (P.G.&E.) on November 22, 1977. Information obtained from the utility company is summarized in the following paragraphs.

Electricity for Yerba Buena Center would be generated from the following sources: 1/

Source of Electrical Energy	% Obtained from the Source
Fossil fuel (Natural gas or low-sulfur fuel oil are used depending on the availability of each)	56%
Hydroelectric (from 67 hydroelectric plants)	17%
Purchased from other utility companies or U. S. Government sources	23%
Geothermal	4%
Nuclear 2/	0%

Natural gas supply for Yerba Buena Center would be available from the following sources: 1/

Source of Natural Gas	% Obtained from the Source
Southwestern U. S.	38%
Canada	45%
California gas sources	17%

The availability of natural gas from these sources is limited both by contract and (ultimately) from the limited amount of natural gas in the wells themselves. Thus, recent rulings of the State of California Public Utilities Commission 3/ have specified that only 50,000 cubic feet per day of natural gas (for an average day during the peak demand month) can be made available to any single customer unless it is demonstrated that no other fuel can meet the need.

Electrical, natural gas and steam facilities in the vicinity of Yerba Buena Center are discussed in Section VII.E., "Community Services".

Gasoline and diesel fuel is utilized on-site by vehicles owned by people who live or work in the Project area, or who park there.

Existing energy consumption for the Project Area is summarized below:

TABLE VII.I.1 ESTIMATED EXISTING ANNUAL ENERGY CONSUMPTION 4/

	Electricity	Natural Gas	Vehicle Energy	Total
Overall Energy Use*	0.32×10^{12} BTU	0.183×10^{12} BTU	0.926×10^{12} BTU	1.43×10^{12} BTU
Energy Use by Type	31.0×10^{6} KWH	166×10^{6} Cubic ft.	4.3×10^{6} gallons	

*This estimate adjusts for energy loses in generation, transmission, distribution, maintenance, etc. as specified by the State Energy Commission and CALTRANS. (Energy Resources Conservation and Development Commission (ERCDC), 1977, p. 2-3, Section T20-1474; Batham, Amos, Smith, and Shirley, 1976, Tables 1 and 5).

Impacts

The estimated 5/ annual equivalent energy use at source for Yerba Buena Center (full development) is shown in Table VII.I.2. The data reflect not only the energy used directly by the Project, but also adjustments for energy losses in generation, transmission, and distribution of each form of energy.

TABLE VII.I.2 ESTIMATED FUTURE ENERGY USE; YBC FULL DEVELOPMENT (1988)

Electricity	Natural Gas	Fuel Oil	Vehicle Energy	Total
* 140 X 10^6 KWH	117 X 10^6 cu. ft.	1.49 X 10^6 gallon	11.8 X 10^6 gallon	
** X 10,200 BTU/KWH	X 1,100 BTU/cu.ft.	X 153,000 BTU/gallon	X 229,000 BTU/gallon	
***1.44 X 10^{12} BTU	0.13 X 10^{12} BTU	0.23 X 10^{12} BTU	2.7 X 10^{12} BTU	4.5 X 10^{12} BTU

* Direct energy use.

** Conversion factor which adjusts for energy losses in generation transmission, distribution, maintenance, etc. as specified by the State Energy Commission and CALTRAN (ERCDC, 1977, p. 2-3, Section T20-1474; Batham, Ames, Smith, and Shirley, 1976, Table 1 and Table 5).

*** Equivalent energy use at source.

Electric energy use (both total and peak) is dominated by the demands of office-type structures both because a great deal of new office space is proposed, and because office uses require a large amount of electricity. Electrical energy is used for ventilation and cooling in office structures, operation of elevators, lighting and operation of office machines. The energy use for cooling is associated primarily with the need to eliminate waste heat (from lights and from the body heat of the office workers), rather than with weather conditions 6/. This also applies to retail commercial uses, which also require large amounts of electricity for essentially the same reasons.

The overall energy use for electrical energy is approximately three times the energy used directly on the site because of losses in generation, transmission and distribution 12/. For this reason, electric energy should not be used for any purpose for which another, more efficient source of energy (such as natural gas) is available 13/.

The natural gas energy use estimate is based upon the assumption that current regulations will continue; i.e., no new natural gas hookups are permitted when the anticipated peak-month demand will exceed 50,000 cubic feet per day for an average operating day in that month. This implies a maximum size of building which can be heated with natural gas; i.e., structures having larger than this maximum heating load must use fuel oil for heating. This means that, to some extent, the natural gas demand of the Project will be determined by the anticipated sizes of the structures.

The residential structures dominate both the total consumption and the peak natural gas demands. Residential uses of natural gas include cooking, water heating and space heating. The demands for these uses frequently coincide during the evening hours. The equivalent energy use at source for natural gas in Table VII.I.2 is 11 percent higher than the natural gas energy used on-site because of the energy cost of securing and transporting natural gas.

The fuel oil energy use is again based upon the assumption that present restrictions for new natural gas hookups will continue, thus requiring oil burners in larger buildings. Therefore, the use will be determined by the anticipated sizes of structures. Office uses dominate the demand for fuel oil. This fuel would be used to provide space heating and hot water. The equivalent energy use at source for fuel oil in Table VII.I.2 is 16 percent higher than the fuel oil energy used on-site; this reflects the energy cost of securing, transporting and refining fuel oil.

The use of vehicle fuel energy for the Project is a direct function of the total (regional) vehicle miles travelled, for all trips generated by the Project. The equivalent energy use at source for vehicle fuel in Table VII.I.2 is 74 percent higher than the fuel energy used directly (for the year 1988). This reflects the energy costs of acquiring, transporting and refining the fuel plus the other energy costs associated with operating and maintaining a vehicle (tires, oil, etc.).

In 1980, annual equivalent energy use at source for the Project area will be slightly higher than at the present; i.e., the addition of the convention center will increase electrical energy use by about 10 percent above levels shown in Table VII.I.1., and will require the use of fuel oil. There will be an increase in vehicle miles travelled; however, the resulting increases in fuel energy use would be partially offset by the increasing fuel efficiency of the auto fleet.

In 1988 (at full development), the Project would require an annual equivalent energy commitment at source of 4.5 trillion British Thermal Units (BTU), which represents an increase of 3.40 trillion BTU over the amount of energy which would be consumed by the non-discretionary uses (Table VII.I.3). About 60 percent of this commitment would be for vehicle energy use. Because of the likelihood of large buildings, the Project would have a larger commitment to the use of fuel oil than to the use of natural gas. Office uses of electricity constitute over 55 percent of the daily electric peak demand and over 60 percent of the annual electric peak demand. Residential uses of natural gas constitute almost 70 percent of the daily natural gas peak demand and about 40 percent of the annual natural gas peak demand.

Table VII.I.4 gives the percentage of non-vehicle energy consumption by use for Yerba Buena Center and demonstrates that the office, commercial and light-industry uses are the primary non-vehicle energy consumers. The office electrical consumption alone is 49 percent of the total non-vehicle energy requirements 7/.

The convention center is estimated to require about 9.8 million kilowatt hours of electricity per year 8/ (0.1 trillion BTU), about 80,000 gallons of fuel oil per year 9/ (0.012 trillion BTU) and about 2.3 million gallons of vehicle fuel per year (0.52 trillion BTU). Thus, the estimated annual overall energy use by the convention center would be about 0.63 trillion BTU, which would be about 14 percent of the energy use of Yerba Buena Center.

TABLE VII.I.3. ESTIMATED ANNUAL OVERALL ENERGY IMPACT IN BRITISH TERMAL UNITS (X 10^{12}) AT SOURCE* YBC FULL DEVELOPMENT 4/

OVERALL ENERGY USE	MINUS NON-DISCRETIONARY** ENERGY USE	= IMPACT
4.5	1.3	3.20

*This estimate adjusts for energy losses in generation, transmission, distribution, maintenance, etc. as specified by the State Energy Commission and CALTRANS (ERCDC, 1977, p. 2-3, Section T20-1474. Batham, Ames, Smith and Shirley, 1976, Table 1 and Table 5).

**Existing, under construction, and committed uses.

TABLE VII.I.4 NON-VEHICLE ENERGY USE

Use Category	Percentage
Office	
Electric	49
Gas & Oil	9.5
Commercial	
Electric	14.5
Gas & Oil	2.8
Light Industrial	
Electric	7.5
Gas & Oil	2.8
Residential	
Electric	4.7
Gas & Oil	3.9
Convention Center	
Electric	5.6
Oil	0.6

Variant or permitted uses could change the estimated annual overall energy use at the source from those values given in Table VII.I.2. For example, addition of a recreation/entertainment park in lieu of a landscaped area on top of the convention center and in block CB-2 will add approximately 0.122 X 10^{12} BTU of total energy requirement due to increased electrical energy. This represents an 8.5% increase in the electrical energy requirement for the Project.

Substitution of a hotel in block CB-1 in lieu of office-retail/commercial will result in negligible changes in total energy requirements; i.e., heating requirements would be increased, but lighting requirements would be reduced. Similarly, substitution of housing in lieu of office-retail/commercial in blocks EB-1, CB-1 and WB-2 will result in negligible net changes.

Substitution of housing in lieu of light industry in blocks SB-2 and SB-3 will result in an increase in heating requirement. Because the electrical requirement for light industry can vary widely depending on the amount of electrically-driven power equipment used, the net change in electrical requirements for the substitution is not known.

The substitution of parking for office-retail/commercial in block EB-3 will reduce energy requirements for heating; conversely, substitution of housing for parking in block SB-3 will increase energy requirements for heating. The impact on vehicle fuel usage is not known and should be determined by a traffic engineer.

Energy required for construction can be estimated based upon the total square footage of structures to be constructed. Construction energy appears to be equal to about 10 percent or less of the total energy usage of the Project (assuming a 50-year building life) 10/. This energy estimate is 10.2 X 10^{12} BTU at full development. There is another aspect of construction energy which cannot be quantified at this time, which is the amount of energy used for excavation and export of earthen material in foundation construction. For the convention center and high-rise buildings, these excavations can be tens of feet deep. Further, an appropriate site for the disposal of the excavated material would necessarily be at some distance from the YBC area. For example, some localities as far away as Richmond are under consideration for disposal of the material from the convention center site.

Mitigating Measures

Energy conservation is national policy. HUD has specified standards, such as the HUD "Minimum Property Standards", which will conserve energy in residential construction that is HUD-subsidized or HUD-insured. These standards are minimum mandatory mitigation. Other mitigation measures may be possible but are not cited in HUD standards, or may require detailed project designs (or preliminary designs) prior to deciding to incorporate the measure(s). Also, some energy conservation

measures are the result of improvements in transportation systems and are discussed in the Transportation assessment. Accordingly, with the exception of HUD's established standards for residential construction, HUD does not find it appropriate or reasonable to unilaterally conceive and mandate mitigation requirements for energy conservation; many mitigation measures are, therefore, recommended for consideration by the San Francisco Redevelopment Agency and the developers, but not mandatory.

For residential construction within Yerba Buena Center receiving HUD subsidies or HUD mortgage insurance, HUD "Minimum Property Standards" for multi-family dwellings 14/, and for one and two family dwellings 15/, provide minimum mandatory requirements. These standards specify maximum "U" values 11/ of insulation depending upon the winter heating degree-days and summer cooling "hours over 80°F". In addition, the standards specify minimum requirements for artifical and natural light in terms of foot candles of illumination required for various locations. The lighting standards must be met, but excessive amounts of artifical lighting should be avoided to conserve electrical energy. Compliance with HUD Minimum Property Standards shall be a requirement of the Land Disposition Agreement for all HUD subsidized/insured housing in YBC.

The Redevelopment Agency could achieve additional energy conservation in dwelling units within YBC by implementing energy conservation measures listed in Table VII.I.5. Appliances and devices listed in Table VII.I.6 can further reduce energy consumption.

For smaller residential buildings, deciduous trees planted on the south side of the buildings can conserve energy by providing shade in the summer months and sunlight during the winter.

For non-residential construction within Yerba Buena Center, the Redevelopment Agency is encouraged to consider a variety of energy conservation measures and strategies which are outlined in the following paragraphs. The mitigation measures discussed should be considered as a means of not just meeting standards but going well beyond them in energy conservation. Also, it should be realized that energy conservation designs for large non-residential buildings are a complex engineering problem. Each structure proposed will require a detailed engineering analysis to determine the net effectiveness of proposed energy conservation features and life-cycle costs. Such analysis must consider the interaction of various energy conservation features and attempt to optimize energy conservation, with acceptable life-cycle costs. In addition, these analyses should include economic factors such as increasing fuel costs and a sensitivity analysis for uncertain future costs.

Transportation energy conservation strategies aim toward reduction of vehicle miles traveled per person for occupants and workers of the Project, and relieving traffic congestion on streets in YBC. Car-pools and van-pools can provide substantial energy consumption savings over commuter use of single or two-occupant automobiles; the use of public

TABLE VII.I.5 - ENERGY CONSERVATION MEASURES FOR DWELLING UNITS

INSULATION

Ceiling - R-30
Walls - R-19
Floors - R-19 instead of R-11 or R-11 if none required by law.
Double glazing when not required by code.

MAJOR APPLIANCES (Builder installed)

Gas range with pilotless ignition
Oven with light and window (gas or electric range)
Thermostatic top burner (gas or electric range)
Dishwasher with switch controllable drying cycle

HEATING

Set-back thermostat (wind-up)
Pilotless ignition system (gas system)
Clogged filter indicator

INDIVIDUAL ZONE (Electric)

Wall mounted thermostats - all zones

HEAT PUMP - CENTRAL UNIT

Multi-Family application - wall units accepted
Unit with cooling ERR - more than 6 recommended.

SOLAR ASSISTED HEATING SYSTEM

(meets 1/3 of annual heating requirements)

WATER HEATING

Conservation model

SOLAR ASSISTED HOT WATER SYSTEM

AIR CONDITIONING

Central or room units
  EER - 7 or more
Attic ventilator (non-electric) turbine type or ridge-roof
Clogged filter indicator

LIGHTING

Fluorescent Application
- Kitchen area
- Laundry area
- Bathrooms
- Recreation room
- Shop or garage

Dimmer Lighting Controls
  Minimum of 3 controls per dwelling

PLUMBING

Heating unit no farther than 15' from point of maximum use (kitchen sink)
Insulated hot water piping (through all unheated areas)

FIXTURES, ALL

Shower heads with flow control devices (rated at 3 GPM or less)
Toilets, 3 1/2 gallon flush models

OPTIONAL BUILDER SUPPLIED APPLIANCES

Refrigerator (low energy consumption) less than 100 kwh/month
Laundry dryer with automatic drying control

Source: Pacific Gas and Electric Company

TABLE VII.I.6 - MANUFACTURER LIST OF ENERGY CONSERVING APPLIANCES AND DEVICES

GAS RANGE	**LAUNDRY DRYER**	**WATER FLOW CONTROL/ SHOWER HEADS**
Caloric	General Electric	Dole (2.5 GPM) Flow Control
Gaffers & Sattler	Hotpoint	Kohler
Modern Maid	Speed Queen	Noland
O'Keefe & Merritt	Westinghouse	Speakman
Tappan	Wirlpool	Wrightway
GAS FORCED AIR FURNACE	**WATER HEATER**	**WATER CLOSETS**
Amana	A. O. Smith	American-Standard
Carrier	Sears	Briggs
Day & Night		Eljer
Payne		Kohler
		Sears
AUTOMATIC SET-BACK THERMOSTAT	**CLOGGED FILTER INDICATOR**	**INSULATED HOT WATER WRAP**
Honeywell	Honeywell	Armstrong
Intermatic (remote mounted)	Sherwood	Deflect-O
Paragon (remote mounted)		
REFRIGERATOR	**DIMMER LIGHTING CONTROL**	**AIR CONDITIONING/HEAT PUMPS**
Wide Availability	General Electric	Room--Check AHAM booklet for ERR's
Check AHAM booklet for KWH/ Mo. usage	Leviton	Central--Check ARI booklet for ERR's
		ERR is determined by: $ERR = \frac{BTUH}{WATTS}$
DISHWASHER		
Wide Availability		

Source: Pacific Gas and Electric Company

Note: This list does not necessarily include <u>all</u> manufacturers of energy conservation appliances and devices. Also, HUD does not endorse the above manufacturers over others not in this listing.

transit similarly conserves energy. Provision of bus passenger shelters and convenient covered access to Bart and Muni streetcars would facilitate public transit use. The Transportation assessment indicates that the parking deficiency for YBC will be 4800 spaces. This could result in an increase in vehicle fuel consumption as drivers "cruise" the area in search of remaining parking spaces. This could also contribute to traffic congestion, increasing fuel consumption. The Transportation assessment discusses parking within the YBC area and other transportation related concerns.

Building operational features are important means of conserving energy because regardless of the energy efficiency of the structures and the mechanisms housed in them, energy could still be used wastefully. Energy-consumption awareness will continue to be important in reducing waste in energy use for any of the contemplated uses. For office uses, electrical lighting is perhaps the most important operation-controlled component of energy use. Use of excessive lighting levels, inefficient or incorrect lamps, inadequate maintenance of automatic lighting-controlled systems, and lighting of unused areas all can contribute to wasteful use of energy. Conversely, scheduling building cleaning and maintenance during normal working hours can reduce energy use for lighting.

Space heating and cooling also represent significant energy use. Energy consumption for heating and cooling can be reduced by prudent settings for thermostats--settings which allow temperatures to drop to 68 to 70 degrees Fahrenheit (or lower) before heating begins and rise to 80 to 90 degrees before cooling begins. Proper maintenance and repair of these systems also is essential to efficient operation. For all uses, operation of machinery or heaters in excess of the needs of the process--be it manufacturing, assembly, maintenance, process/space heating, or transportation--will waste energy.

Building design features can be incorporated to further improve the energy efficiency of the structures. Among those design features which are desirable for increasing energy efficiency are:

For lighting systems;

- Natural light from north exposures should be used whenever possible to supplement building interior lighting systems.

- Lighting level needs should be accurately determined and excess lighting should be eliminated. Illumination levels recommended in the Illumination Engineering Society (IES) Lighting Handbook should not be exceeded for various types of use (general office, commercial, etc.).

- Fluorescent lighting should be substituted for incandescent lighting wherever feasible because it utilizes approximately one-third as much power for the same amount of light output.

- Decorative lighting should be eliminated or severely restricted.

- High-intensity discharge (HID) lighting (such as high-pressure sodium, low-pressure sodium, mercury-vapor, or metal-halide lighting) should be used for exterior street and area lighting provided it is compatible with existing lighting systems.

- Lighting should be wired to permit local control of lighting levels.

- Water-cooled luminaires should be used to reduce the load on air conditioning systems.

For heating-ventilating-air conditioning (HVAC) systems;

- Heat transfer rates through ceilings, walls and floors of buildings should be lower than required by State energy conservation standards.

- Designs which place insulation on the outside and retain the thermal mass of the structure inside are more effective in maintaining desired interior temperatures, and are encouraged.

- Care should be taken to control light and the resulting solar heat gain to the interior of the structure in order to reduce the load on the building HVAC system. Tinted glass, or glass with reflective film (where not subject to damage), is desirable on those sides of buildings which receive direct sunlight (especially on the south and west sides).

- HVAC systems should be designed to provide maximum efficiency. For example, ventilation flow rates shall be as low as possible to minimize energy consumption--for air movement as well as for heating and cooling of unnecessary volumes of air. HVAC systems design must consider all aspects of waste heat management including control of heat from lighting (by, for example, water-cooled fixtures) and from people and machinery. The basic HVAC system components--including blowers, boilers, and refrigeration units--should be carefully chosen and sized for high operating efficiency. Control systems and zones for the system should be designed to encourage rather than discourage energy conservation.

- Energy demands of parking structures can be substantially reduced by using elevated structures to eliminate the need for forced-ventilation and relatively large lighting energy needs of underground structures.

- Solar energy for space heating or for water heating should be carefully investigated. Applications for HUD solar energy grants or solar energy demonstration projects are encouraged.

For industrial processes;

- The energy efficiency of basic industrial processes (as well as the efficiency of machinery and other components of industrial manufacturing, assembly, and support operations) should be analyzed.

- Recovery of waste heat from industrial processes for conversion to useful work should be investigated.

- Use of efficient motors and heat transfer equipment can reduce energy waste, and should be considered.

Variant or permitted uses should be selected or designed so as to conserve energy. For example:

- If a recreation/entertainment park is substituted in lieu of open landspaced areas, the use of decorative incandescent lighting should be minimized; instead, more efficient types of lighting (fluorescent, mercury-vapor, etc.) should be used;

- A decision to substitute additional housing for parking in block SB-3 would increase the parking space deficiency above the 4800 spaces cited in the Transportation assessment, and could result in increased traffic congestion and, consequently, increased consumption of vehiclar fuel. Conversely, providing parking in lieu of office-commercial/retail in block EB-3 would reduce parking space deficiencies to below 4800 spaces, which could relieve traffic congestion and conserve vehicular fuel. However, the use of public transportation instead of private cars would favorably resolve the parking space shortage and incrased use of fuel.

Total energy systems are another method of energy conservation for large commercial buildings. These systems use on-site generation of all electricity for non-cooling electrical loads (lighting, elevators, fans, etc.), absorbtion-type chillers for cooling, and oil-fired or gas-fired boilers for heating. Energy rejected from the prime mover engine generators, which are used to generate electricity, is used to reduce the fuel otherwise required for heating and cooling. Absorbtion chillers utilize heat directly to produce chilled water, in contrast with electric chillers using a mechanical refrigeration cycle.

Such total energy systems have been analyzed by Salter, et al. (1976) for nonresidential buildings. The analysis demonstrates that the net potential energy savings in fuel required are complex functions of the relative noncooling electric load, the heating load and the cooling load

for the specific structure. These relative loads are related to design, use and climatic location of the building. Primary energy savings of 10 to 20 percent are shown to be obtainable over energy supplied by an electric utility, depending on the variables discussed above.

The total energy system requires substantially more initial cost than a conventional HVAC system; however, significant savings in annual operating costs (no purchase of electricity) should pay for the incremental investment over the life of the system.

A life-cycle analysis of a one-million square foot hospital proposed for the Bay Area has been reported by Goldstein and Rosenfeld (1975) which indicates a 43 percent primary energy saving and a 15 percent cost advantage for a total energy system using a diesel generator.

Implementation of a total energy system could be accomplished for individual larger buildings proposed within YBC; however, it may be that maximum energy conservation and life-cycle costs would require a more complex arrangement where electric generators for one large structure would supply electricity to adjacent smaller structures. The City might have to support such arrangements by altering public utility regulations. An alternative means of arranging a total energy system for YBC buildings is to encourage Pacific Gas and Electric Company to provide an appropriately-sized electric generating plant adjacent to the site to supply both electricity and waste heat. This approach would introduce a single, and potentially better regulated, air pollution point source rather than several smaller point sources.

<u>Extension of the Bay Area Rapid Transit (BART)</u> system from Daly City south to San Francisco International Airport in San Bruno, with provision for possible future extension south of the airport, could reduce vehicular traffic between the airport and convention center, thereby conserving vehicular fuel.

<u>Implementation of underground municipal railway service</u> along Market Street will relieve traffic congestion and may reduce vehicular traffic in the vicinity of YBC, which will also conserve vehicular fuel.

WATER RESOURCES

Additional consumption of water is anticipated as a result of the development of the proposed Yerba Buena Center. Thus, it is necessary to consider the impact of this additional water consumption on the available sources as well as the adequacy of these sources to serve the increased demand in light of the recent - and possible future reoccurrence - drought conditions. (The adequacy of the water delivery system is addressed in the section on Community Services).

Environmental Setting

The San Francisco Water Department, under the control of the San Francisco Public Utilities Commission, provides water to the City of San Francisco and areas of the Peninsula and Alameda County. Water stored in the Hetch Hetchy reservoir system in the Sierra Nevada is brought to Crystal Springs and San Andreas Reservoirs on the Peninsula. The Hetch-Hetchy water system pipeline has a delivery capacity of approximately 350 million gallons of water per day (mgd); 300 mgd comes from the reservoir system in the Sierra and 50 mgd is contributed by Bay Area reservoir watersheds.[1] This delivery capacity may be increased by the installation of a fourth pipeline across the San Joaquin Valley to yield a total delivery capacity of 450 mgd. Completion of this work is planned by 1990, but it would require that a bond issue be passed.

The storage capacity of the Hetch-Hetchy System is 214,000 million gallons; the Alameda County and Peninsula reservoir have a storage capacity of 78,000 million gallons; the capacity of the Peninsula reservoirs alone is 29,800 million gallons.[2] During years of normal precipitation, the reservoir system would be at 65-67 percent of capacity during July-August. The region has been experiencing drought conditions, however, for two years and, as of July 29, 1977, the reservoir system was at 44 percent of capacity. A mandatory rationing program to reduce water consumption systemwide by 25 percent has been successful. Consumption has been reduced by approximately 40 percent and the water supply situation is not critical at the present time.[1] On the basis of a continued lower water consumption rate of at least 25 percent below normal, the San Francisco Water Department expects to be able to continue to meet the system's demand for water, even if there is no relief from the drought for a third year. (The Yerba Buena Center Area itself has shown an estimated 25-30 percent decrease in consumption during the recent conservation effort).[3]

One half (68 percent) of YBC is vacant or used for parking; some of the buildings are also vacant. San Francisco Water Department records show on-site consumption of 48.1 million gallons for the year from June 1976 through May 1977 as indicated in the table below.

CURRENT WATER CONSUMPTION BY LAND USE*
YERBA BUENA REDEVELOPMENT AREA

Land Use Category	Floor Space** sq. ft.	Annual Water Consumption mg.	Water Consumption $g/ft^2/year$
Community Service	102,000	.99	10
Office	1,413,000	29.96	21
Retail-Commercial	66,000	2.88	44
Retail-Office	89,000	0.68	8
Light Industrial	169,000	1.83	11
Downtown Support	88,000	1.59	18
Housing***	276 D.U.	10.15	36,800 g/DU/year (100 g/DU/day)
Total Annual Consumption:		48.08	
Average Daily Consumption:		0.132 mgd	

*From records of the San Francisco Water Department (June 1976-May 1977).
**Buildings which are vacant or under construction are not included.
***Clementina Towers only. 15,600 sq. ft. of garden space use included.

The average daily damand in the Redevelopment Area of .132 mg represents 0.6 percent of the average consumption of 22 mgd from University Mound Reservoir and 0.05 percent of the total system consumption of 276 mgd. Peak demand in the Yerba Buena Center area is estimated at 0.21 mgd.[2]

PROJECTED WATER CONSUMPTION BY YBC: 1988

Existing Uses	Committed Uses	Designated Uses		Total Consumption As a Percentage Of ADD***		Designated Use Peak Demand	Total Consumption YBC		Total Consumption As a Percentage of ADD***	
				S.F. Only*	System-wide**				S.F. Only*	System-wide**
mgd	mgd	mg/year	mgd			mgd	mg/year	mgd		
0.171	0.074	464	1.27	1.12%	0.46%	2.16	554	1.52	1.37%	0.55%

*San Francisco average daily demand was 111 mgd in 1976. For worst-case analysis of YBC percentage, assumed to remain constant.

**San Francisco Water Department systemwide average daily demand was 276 mgd in 1976. For worst-case analysis of YBC percentage (highest percentage), consumption is assumed to remain constant.

***ADD = Average Daily Demand.

Impacts

Existing Yerba Buena Center Redevelopment Area uses currently consume 0.132 million gallons of water per day (mgd) or 48.1 million gallons (mg) per year.[4]

Assuming normal water supply conditions, by 1988 water consumption by existing buildings and committed uses (including the convention center) would total 0.25 mgd or 91.3 mg per year. (See Table).

Peak demand is estimated to be 2.16 million gallons per day, due, in large part, to the intermittent convention center use by up to 30,000 persons per day.[5] The factor normally used by the San Francisco Water Department to estimate peak demand from average daily demand is 1.6, averaged over all land uses. The special circumstances associated with the convention center would effectively raise the factor for the whole Redevelopment Area to 1.7. Offices would account for one 60 percent of the water consumption based on all of the determined uses.

If the Redevelopment Agency's final decision replaces some office and commercial space with housing and public parking as indicated under "permitted" uses, the overall water usage would be above the same as indicated on the table for the determined uses because of the disproportionate use of water in residences. (Refer to Appendix J for water consumption generation factors).

Mitigation

- O The Redevelopment Agency will require in each disposition agreement for all uses, including residential, to require the use of low-flow toilets, urinals, taps, and showerheads to reduce water consumption.[6]

- O The redevelopment Agency has agreed to use a water-efficient form of irrigation, such as drip irrigation, and drought-resistant landscape materials in the park area to reduce irrigation.[6] This requirement will be included in the disposition agreement.

- O After the convention center is completed, it is recommended that the dewatering pump installed to prevent the rise of the water table above -2 feet be used to pump water for landscape irrigation.

  Implementation of this provision would be dependent on the quality of the water and the ability of the structure to withstand changes in the level of the water table. It is under consideration by the convention center engineers.[7]

- O It is recommended that dewatering waste water from the convention center be used by the Bureau of Street Cleaning to water street trees; the Department of Public Works currently owns tank trucks which carry dewatering wastes for this purpose. Use of this water would depend on the needs of the Tree Division at the time of construction.[8]

Footnotes

1/ Phonecon between C. H. Kenaston (HUD) and Gerald Tyson (P.G. & E. Commercial/Industrial Supervisor) on November 22, 1977.

2/ Nuclear sources of electrical energy will become approximately 7% of the total sources of electricity when 1,000 MW of power from the Diablo Canyon nuclear plant are placed on the distribution system in 1978.

3/ P.U.C. Decision No. 85189, December 2, 1975.

4/ Calculations are on file at the HUD San Francisco Area Office, Environmental Staff Unit.

5/ These estimates should be understood to have been made on the basis of the types and amounts of uses for each alternative on a square-foot basis. Since no specific plans were available, estimates assume that all structures would be constructed or renovated to meet the applicable Energy Conservation Standards of the State Energy Commission.

6/ However, seasonal variations in temperature are reflected in the monthly variations in electrical demand.

7/ Energy consumption estimates for all buildings were based on the energy use standards for new construction as specified by the California Energy Resources Conservation and Development Commission. These standards specify annual source energy use per square foot of floor area.

8/ Charles H. Shalley (Project Electrical Engineer, The Engineering Enterprise) letter to the City and County of San Francisco dated September 6, 1977.

9/ Telephone Conversation between C. H. Kenaston (HUD) and Hideo Akagi (Engineer, Hayakawa and Associates) of December 9, 1977.

10/ Correspondingly less if buildings survive for longer times.

11/ Defines the rate of heat transfer through walls, ceilings or floors.

12/ One Kilowatt-hour is equivalent to 3413 BTU's at the point of utilization (standard conversion factor). However, in order to produce each kilowatt-hour of electrical energy at the point of utilization, approximately 10,200 BTU (see Table VII.I.2 in text) must be produced at the source (steam generating station) by combustion of natural gas. The ratio of 10,200 BTU at the source to 3412 BTU at the point of utilization is 2.988, or approximately 3.

13/ If an electrical appliance is used, such as an electric hot water heater, 10,200 BTU are consumed at the source (electrical generating station) for each 3,412 BTU of heat produced by the appliance. However, selection of a gas appliance would result in only 3781 BTU of energy consumed at the source (natural gas field) for each 3,412 BTU of heat produced by the appliance. The savings is 6413 BTU (10,200 minus 3,787) of natural gas at the source for each 3412 BTU of heat provided by the appliance.

14/ HUD Minimum Property Standards, 1973 Edition, Multifamily Housing, Publication No. 4910.1, U. S. Department of Housing and Urban Development, Section 607.3 ("Building Insulation").

15/ HUD Minimum Property Standards, 1973 Edition, One and Two Family Dwellings, Publication No. 4900.1, U.S. Department of Housing and Urban Development, Section 607-3 ("Building Insulation").

FOOTNOTES

Water

[1]James Leonard, Public Service Director, San Francisco Public Utilities Commission, telephone conversation, August 10, 1977.

[2]San Francisco Public Utilities Commission, 1967, San Francisco Water and Power.

[3]Robert Vasconcellos, Acting Manager, Commercial Division, San Francisco Water Department, letter to ESA dated August 3, 1977.

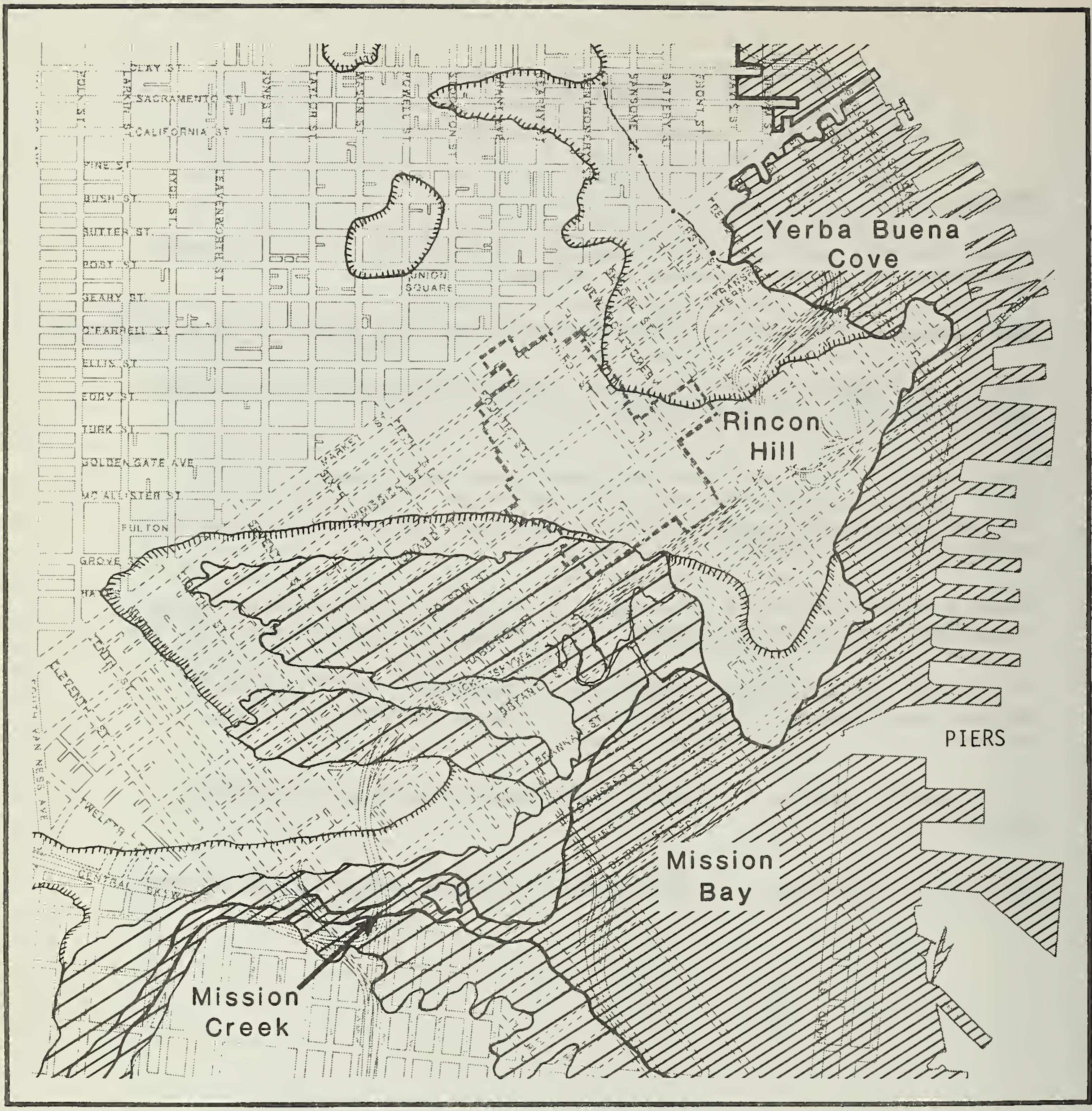
[4]From records of the San Francisco Water Department, June 1976 - May 1977. Because of conservation during two months of this period, the rate is lower than it would be in a normal year (about 5-10 percent low, averaged over the year).

[5]Peak attendance estimate provided by R. Sullivan, General Manager, San Francisco Visitors and Convention Bureau, telephone communication.

[6]T. Conrad, Chief Planning, Housing and Programming, San Francisco Redevelopment Agency, telephone communications, September 2, 1977, November 15, 1977, and December 8 and 9, 1977.

[7]W. Takahashi, Engineer, Hayakawa Associates, telephone communication, September 2, 1977.

[8]D. Martin, Department of Public Works, telephone communication, November 18, 1977.



LEGEND

Former bay & creek, now artificially filled

Former marsh, now artificially filled

Limit of artificial fill on land areas

1849 Shoreline

0 0.5 Kilometer

0 1800 Feet

N

SHORELINE OF
SAN FRANCISCO IN 1853

Source - Schlocker, J., 1974, op. cit.

GEOLOGY AND SEISMOLOGY[1]

Environmental Setting

TOPOGRAPHY

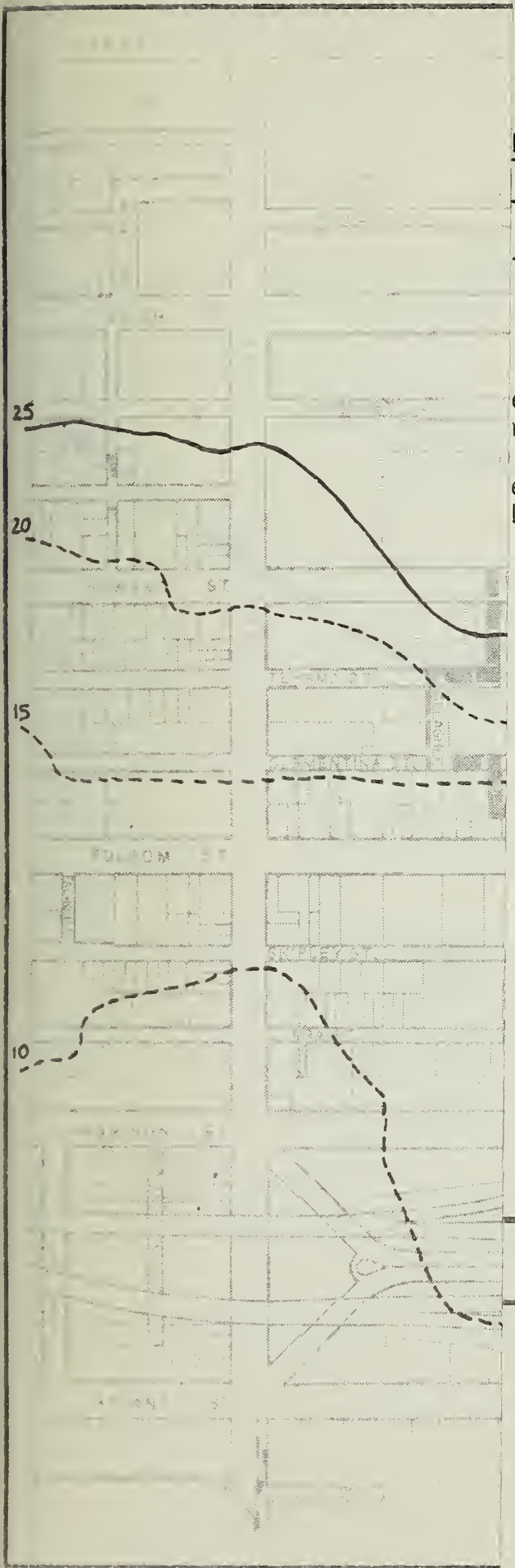
Elevations in YBC range from about 12 feet above mean sea level (MSL) in the southwestern corner to over 50 feet in SB-3 (see Figure on Topography following). Most of the area slopes gently down to the southwest.

GEOLOGIC MATERIALS

Yerba Buena Center is located in a geologic area in which unconsolidated (loose, non-rocklike) sediments rest upon bedrock (Figure, on Geology). Bedrock forms the surface material in about ten percent of the project area, in SB-3 and SB-4, which form the southwestern flank of Rincon Hill. The bedrock is Franciscan formation rock, which is a mixture of dark colored muddy sediments, red, green and brown cherts and lava flows of black basalt. In this area of San Francisco the Franciscan formation is predominantly layered medium-grained sandstone and shale with lesser amounts of serpentine and volcanic greenstone. Fresh Franciscan rock is generally an excellent foundation base.[2] Weathered Franciscan rocks vary in stability. Weathering of the bedrock on Rincon Hill produces mostly sandy, silty clay soils.

Bedrock lies buried beneath unconsolidated sands and mud in approximately 90 percent of YBC. The standard U.S. Geological Survey symbol for undifferentiated sands and muds of this age is "Qu". "Undifferentiated sediments" means that the layers are intermixed so that they are difficult to distinguish. The depth to bedrock varies considerably and irregularly but generally increases toward the north to about 270 feet, away from Rincon Hill where bedrock is at the surface (Appendix L). The sediments overlaying the bedrock are formed in a series of beds of muds, sand and gravel. The deposits are generally classified as follows (oldest and deepest-lying first): the older bay mud, the Colma Formation, and the younger bay mud. The Colma Formation is predominantly dune sand and is the material upon which highrise buildings constructed upon bay sediments are usually founded. The younger bay mud is generally unstable and therefore unsuitable as a foundation base. Graded dune sands form the surface material over most of YBC. The standard U.S. Geological Survey map symbol for dune sand of this age is "Qd".

Two areas in YBC are covered with artifical fill, composed of dune sand, silt, clay, rock waste from excavations, man-made debris, and organic waste. The standard U.S. Geological Survey map symbol for artifical fill is "Qaf". In the eastern portion of the project area, in EB-2 and EB-3, the artifical fill was dumped on low-lying land to a depth of 30 feet (Figure, opposite). In the southwestern portion of the area, in



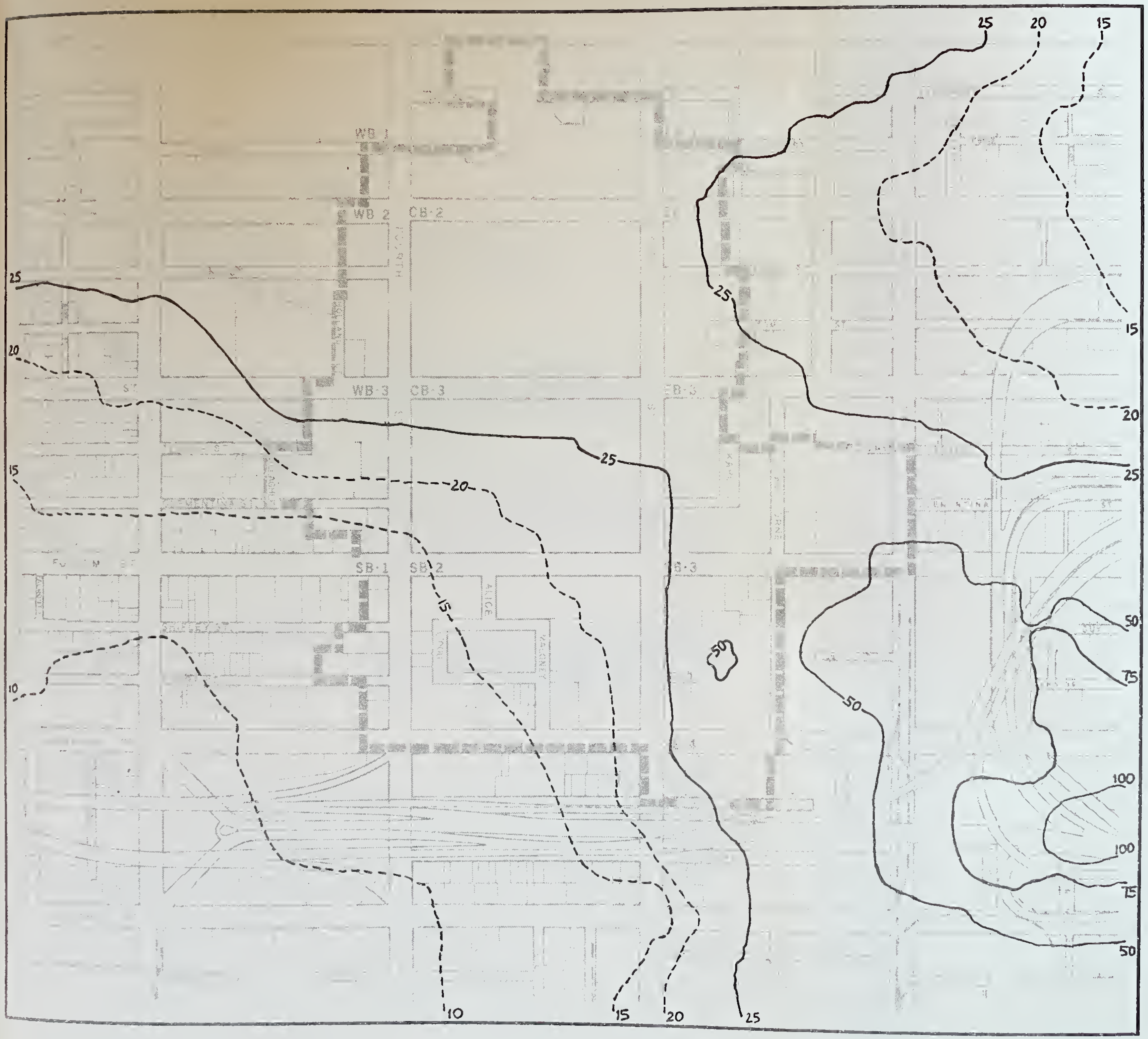
D

– Contour Interval 25 feet

– Supplementary Contour Interval 5 feet

e - U.S. Geological Survey 7.5 Minute
raphic Map, 1968
: Mean Sea Level
elevations in reference to San Francisco
Datum subtract 8.69 feet)

TOPOGRAPHY



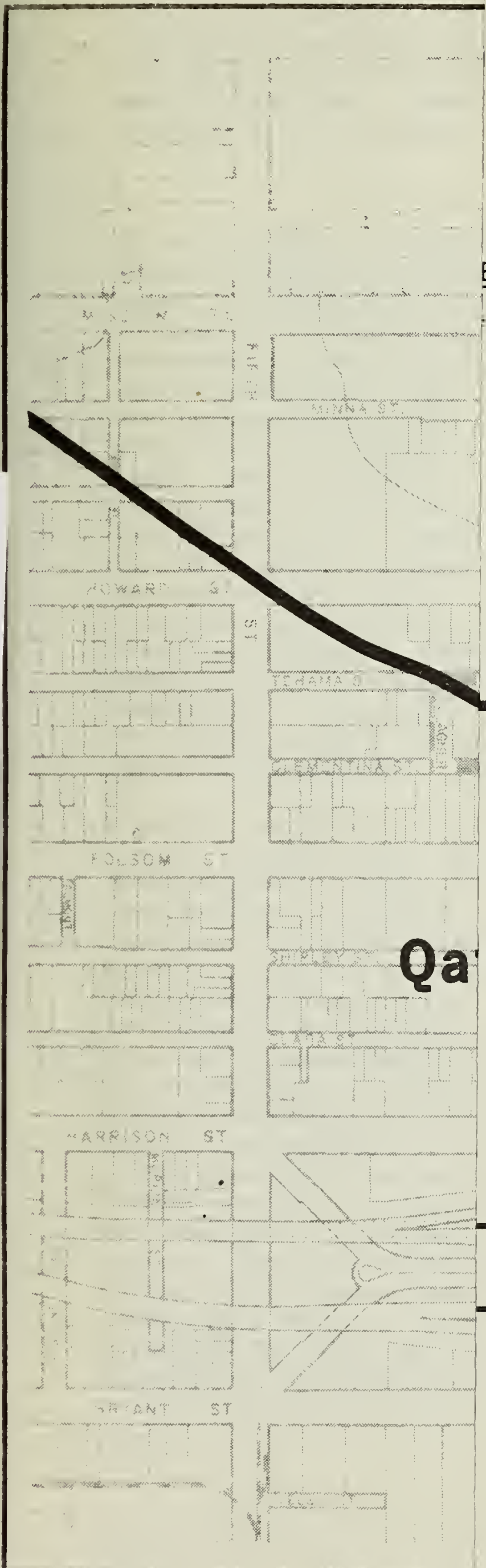
LEGEND

——— Contour Interval 25 feet

------ Supplementary Contour Interval 5 feet

Source - U.S. Geological Survey 7.5 Minute Topographic Map, 1968
Datum: Mean Sea Level
(for elevations in reference to San Francisco City Datum subtract 8.69 feet)

TOPOGRAPHY



END

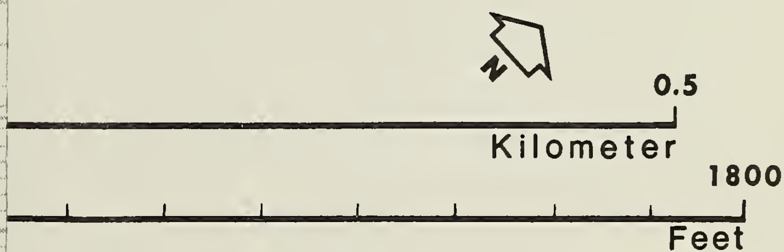
Artificial fill
(dune sand, including silt, clay, rock and organic waste, man-made debris)

Dune sand

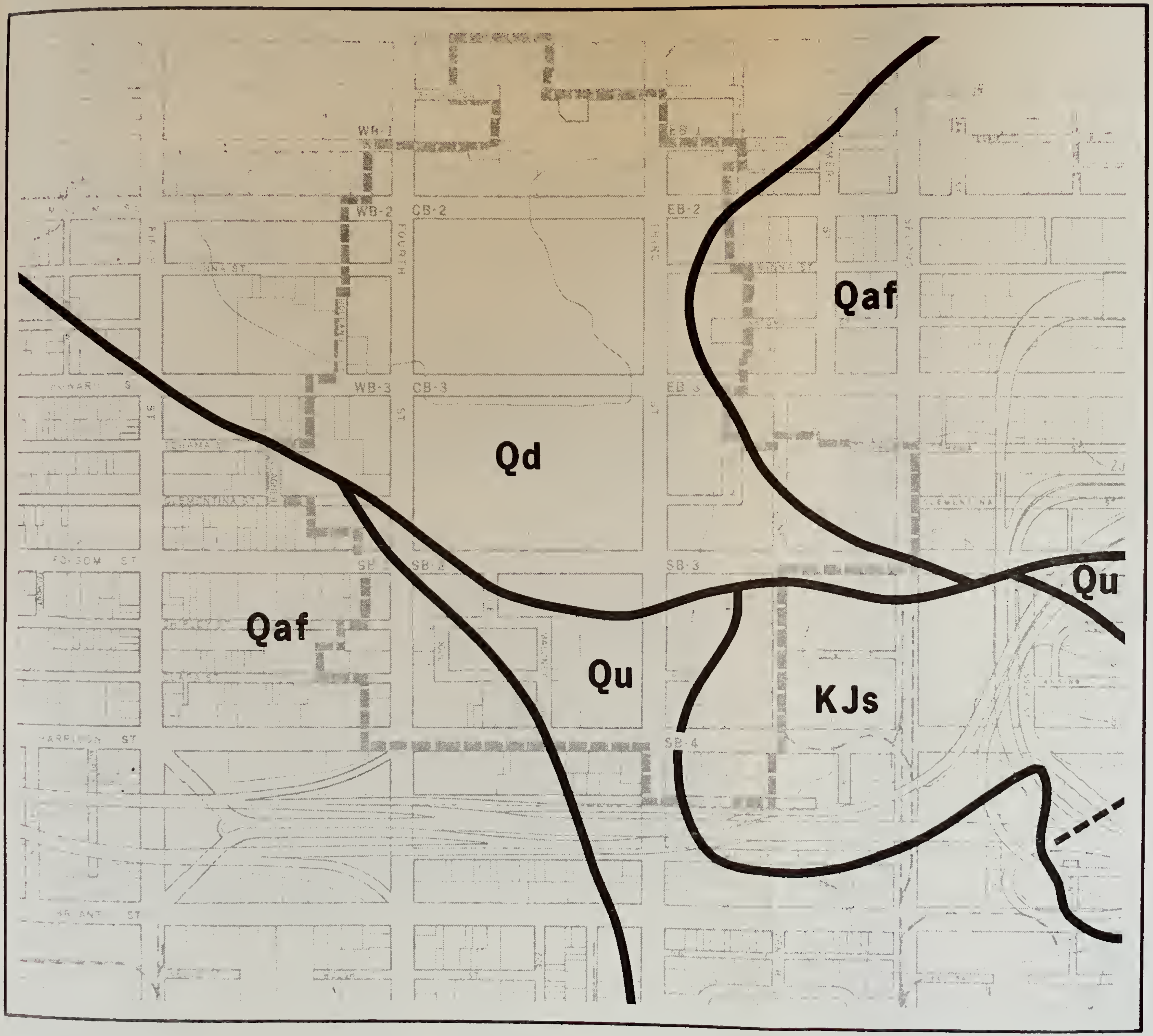
Undifferentiated sediments
(intermixed sand, silt, and clay; distinct layers difficult to distinguish)

Inactive fault
(a fault which is probably incapable of producing an earthquake and having no record or geomorphic evidence of movement in about the last 11 thousand years)

Source - Schlocker, J., 1974, Geology of the San Francisco North Quadrangle, California, Professional Paper 782, U.S. Geological Survey, Washington, D.C.



GEOLOGY



LEGEND

Qaf — Artificial fill (dune sand, including silt, clay, rock and organic waste, man-made debris)

Qd — Dune sand

Qu — Undifferentiated sediments (intermixed sand, silt, and clay; distinct layers difficult to distinguish)

▬ ▬ Inactive fault (a fault which is probably incapable of producing an earthquake and having no record or geomorphic evidence of movement in about the last 11 thousand years)

Source - Schlocker, J., 1974, Geology of the San Francisco North Quadrangle, California, Professional Paper 782, U.S. Geological Survey, Washington, D.C.

N

0 — 0.5 Kilometer

0 — 1800 Feet

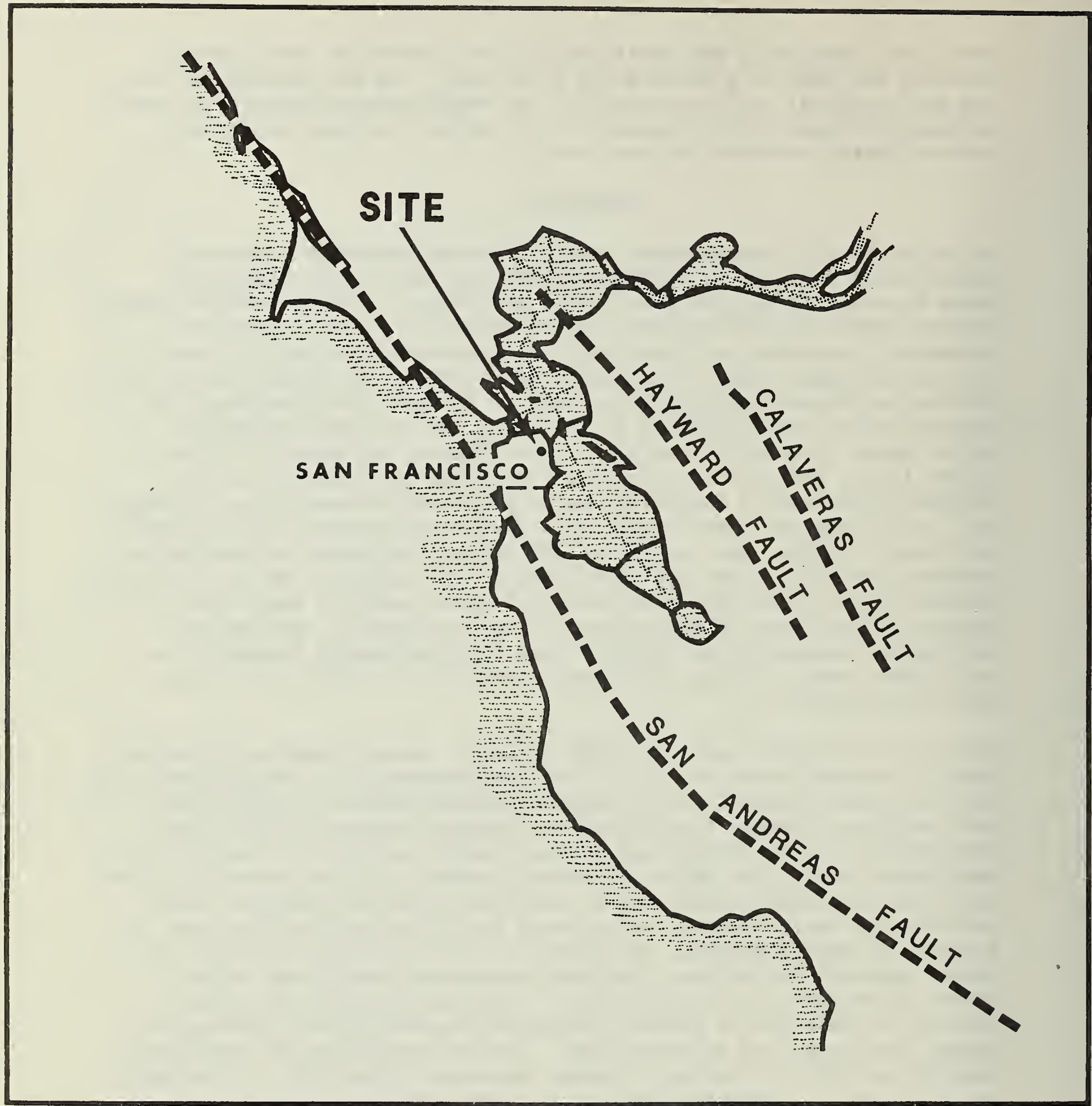
GEOLOGY

SB-1, SB-2, and WB-3, the artifical fill was dumped on tidal marsh (younger bay mud) to a depth of 10 to 20 feet. As the younger bay mud and the artifical fill are unstable, the engineering properties of these surfaces are poor. (See Appendix L for further information on the unconsolidated sediments of the area.)

SEISMOLOGY

No active faults (faults which have a historic record or geomorphic (structural) evidence of movement within the last 10,000 years) are known to exist within the City of San Francisco. A small inactive fault (a fault which geologists regard as incapable of producing seismic movements) is mapped on Rincon Hill to the east of the project area. Several important active fault zones which affect the area include: the San Andreas Fault, about 15 miles west of downtown San Francisco; the Hayward Fault, about 15 miles to the east; and the Sunol-Calaveras Fault, about 30 miles to the east. (See Figure, following). Other active faults may exist in the area. Both the San Andreas and the Hayward Faults have a history of major and minor movements (see Appendix L). Both large and small earthquakes can be expected in this region in the future. Within the next 60 to 170 years, (estimates of recurrence intervals vary) at least one earthquake of the magnitude of the 1906 San Francisco earthquake (about 8.3 on the Richter scale of magnitude - a measure of the total energy released by an earthquake), and several earthquakes comparable to the 1957 Daly City earthquake (about 5.3 on the Richter scale of magnitude) can be expected to affect the Yerba Buena Center site.[3&4]

Potential earthquake hazards in YBC include: ground shaking; liquefaction of unconsolidated materials (the transformation of granular material, such as loose wet sand, into a fluid-like state similar to quicksand) with resultant lateral landsliding and bearing capacity failure; and subsidence (sinking of the land surface due to settling of compressible earth materials). The degree of hazard depends upon the location of the earthquake epicenter (the point on the earth's surface directly above the focus of an earthquake) relative to the site, the magnitude and duration of ground-shaking, the nature of the topography, the type of ground material in the area, and the groundwater conditions (which affect landsliding and liquefaction). The importance of the ground material in relation to seismic hazard is stressed in many reports on damage resulting from an earthquake. The key conclusion of the Carnegie Report[5] was that the amount of damage produced by the 1906 earthquake in San Francisco "...depended chiefly upon the geological character of the ground. Where the surface was solid rock, the shock produced little damage; whereas upon 'made' land, great violence was manifested. Other conditions, however, exerted a controlling influence." Building construction technique was one such controlling influence. The chief types of material described earlier and their relative stabilities under seismic movement are as follows:



Source-Schlocker, J., 1974, op. cit.

0 10
Miles

MAJOR ACTIVE FAULTS IN SAN FRANCISCO BAY AREA

Artifical Fill (Qaf): susceptible to failure, buckling on the ground surface, fissuring, cracking, bending of rails, liquefaction and subsidence.[6]

Dune Sand (Qd): In general, a low potential for failure. If the groundwater table is near the surface and the sand is loose, a high potential for liquefaction exists.[7]

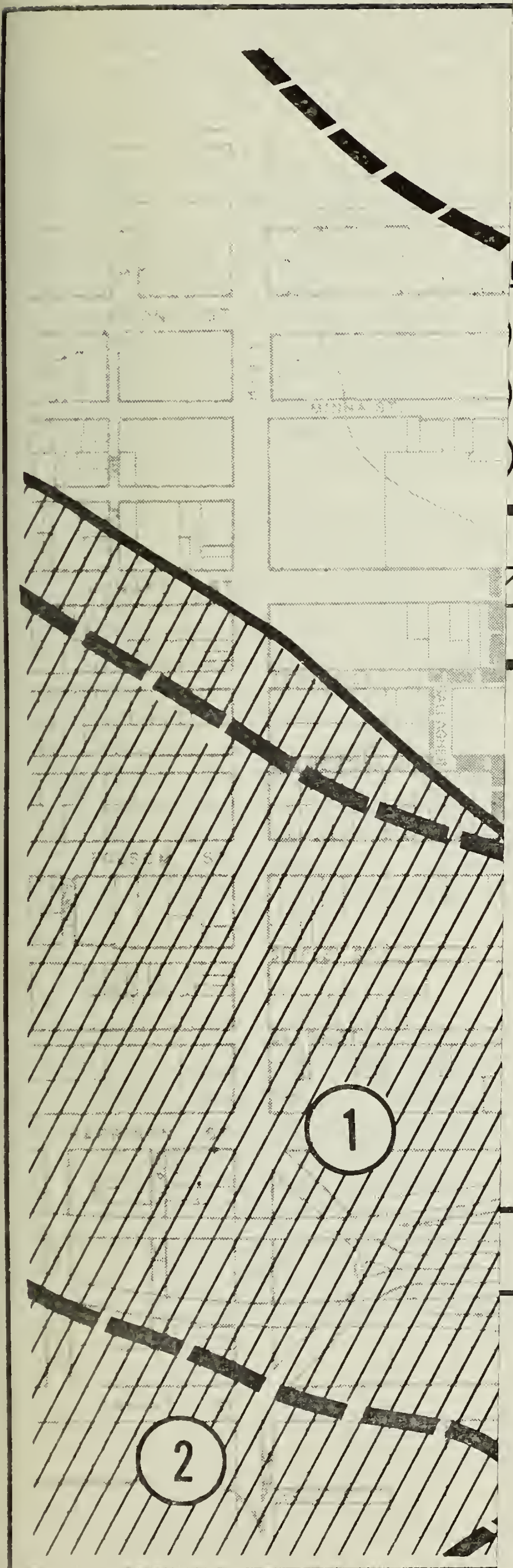
Undifferentiated Deposits (Qu): Mostly have fair to good stability.[7]

Franciscan Rock (KJs): If fresh, good stability. Sheared Franciscan rock has relatively low stability.[8]

The probable maximum intensity of a future earthquake within the San Francisco Bay region can be expected to be comparable in magnitude and duration to the 1906 San Francisco earthquake. The following figure maps the areas of potential ground shaking, liquefaction and subsidence hazard which could affect the area. The map largely reflects the control of the geologic materials over seismic hazard potential.

The most-hazardous zone (Zone 1) during an earthquake is the southwestern portion, including parts of SB-1 and SB-2. Zone 1 is an area in which "violent" groundshaking is expected with general collaspse of brick and wood-frame structures, when not unusually strong, and cracking of better buildings. Lateral displacement of streets, bending of rails, and ground fissuring might occur. The violent ground shaking is expected here because of the presence of unstable artifical fill which was dumped upon soft bay mud.

The area is low-lying and receives the subsurface drainage of groundwater from the surrounding higher areas. The groundwater table is near the surface so liquefaction is also a potential hazard. Liquefaction induced by a major earthquake could result in lateral-spreading landsliding (landsliding with primarily horizontal displacement and little vertical movement) and bearing capacity failure. During the 1906 earthquake, liquefaction produced lateral displacemnts of about six feet and vertical displacements as large as three feet in the area.[9] Such lateral displacements could cause collapse of buildings, buckling of curbs, walls and rails, and breaking of water and utility lines. Subsidence is an additional hazard which could result in loss of foundation support, differential settling of structures and buoyant rise of buried objects whereever bearing capacity fails. Quicksand conditions might occur locally. Slow subsidence is occurring presently in the area. The amount of subsidence varies locally, with as much as seven feet of settlement having occurred since the 1906 earthquake in the South-of-Market area.[10]



D

Violent Ground Shaking

Very Strong Ground Shaking

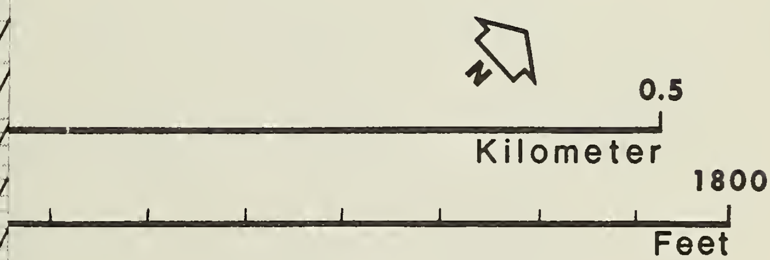
Strong Ground Shaking

Boundaries of Ground Shaking Areas

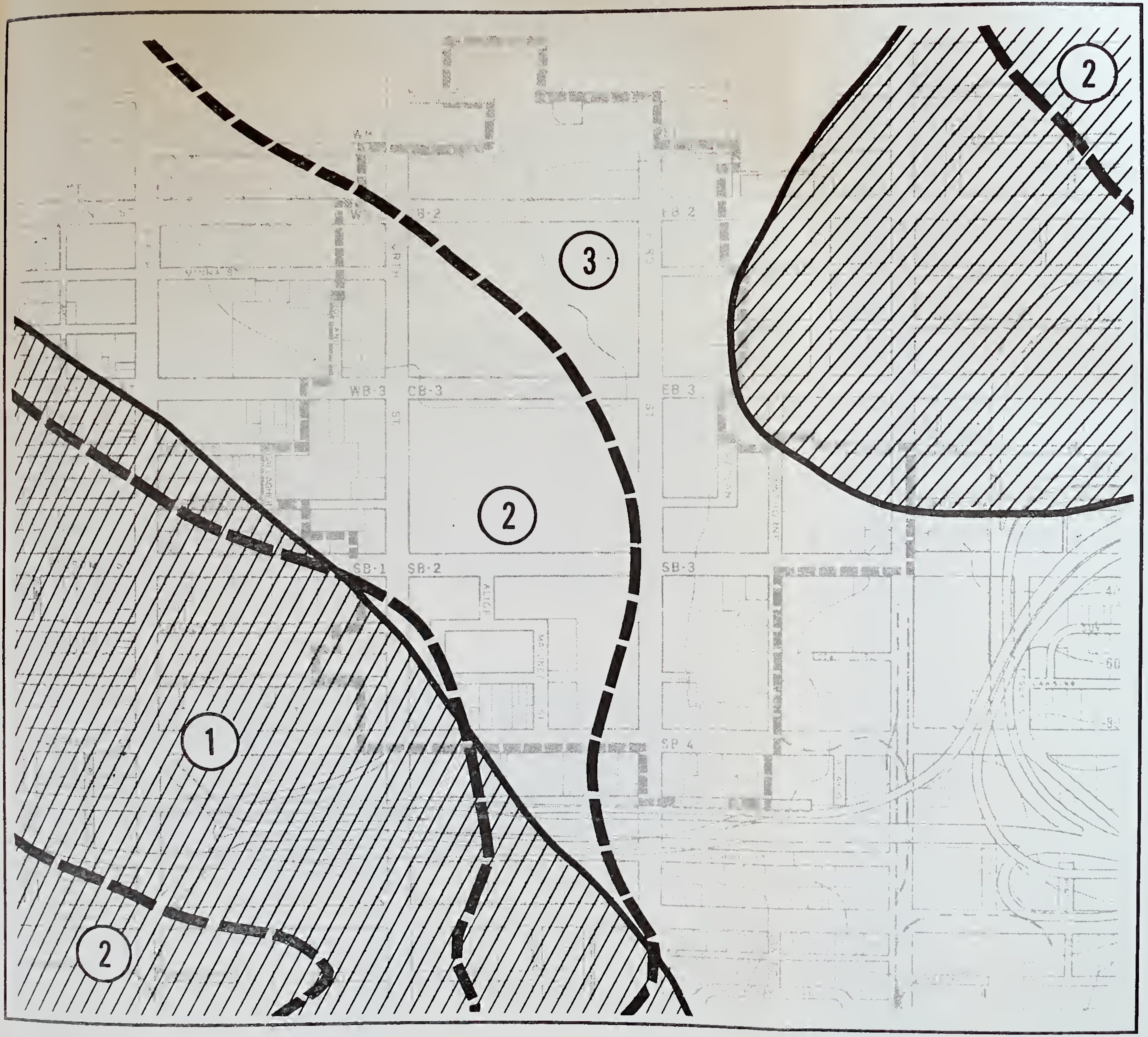
Area of Liquefaction and Subsidence Potential

Boundaries of Liquefaction/ Subsidence Potential Areas

Source - <u>San Francisco Seismic Safety Investigation Geologic Evaluation</u>, 1974.
John A. Blume & Associates



AREAS OF POTENTIAL SEISMIC HAZARD



LEGEND

(1) Violent Ground Shaking

(2) Very Strong Ground Shaking

(3) Strong Ground Shaking

Boundaries of Ground Shaking Areas

Area of Liquefaction and Subsidence Potential

Boundaries of Liquefaction/ Subsidence Potential Areas

Source - San Francisco Seismic Safety Investigation Geologic Evaluation, 1974. John A. Blume & Associates

AREAS OF POTENTIAL SEISMIC HAZARD

No portion of YBC is within the estimated run-up area of a 500-year tsunami (a series of sea waves created by an earthquake, a coastal or submarine landslide or a volcanic eruption at some distance from the point of run up) or a seiche (a "sloshing" of water in a confined basin, such as San Francisco Bay, caused by an earthquake or landslide within or near the basin).[11]

In Zone 2, including portions of CB-2, CB-3, SB-1 and SB-2 and all of WB-2 and WB-3, ground shaking in a major earthquake is expected to be "very strong" and result in possible cracking of masonry and occasional collapse of structures. Frame buildings might lurch if they are on a weak underpinning. The area is underlain by deep, unconsolidated mud and sand, covered for the most part with loose dune sand. Liquefaction and subsidence probably pose no general hazard because the geologic meterial is more stable and the groundwater table is lower than in the 1906 earthquake. Sidewalks and streets might crack and buckle, and water mains and utility lines might break. Local differential subsidence of structures might occur.

Zone 3, including portions of CB-2, CB-3 and SB-2, and all of CB-1, WB-1, EB-1, EB-2, EB-3, SB-3 and SB-4, is expected to experience the least potential hazard in a major earthquake. "Strong" ground shaking is anticipated; it may be expected to produce general, but not universal falling of brick chimneys, and to crack masonry and brickwork. Collapse of structures due to ground shaking would probably be uncommon. Most of the area is covered by unconsolidated sediments which are more stable and/or shallower than those in Zones 1 and 2. The lowest intensity of shaking may be expected in the southeastern portion of the area on the flank of Rincon Hill, where bedrock lies at the surface. Potential liquefaction and subsidence might occur in EB-2 and EB-3, where artifical fill forms the surface material. That area is higher-lying, the water table than in Zone 1. Thus, the hazard may not be as great as in Zone 1, but local ground failure could occur. Quicksand conditions might occur locally.

Impacts

The designated uses in the Redevelopment Plan would allow highrise buildings to be constructed in CB-1 and CB-2 and in the eastern blocks. The unconsolidated (loose debris) geologic materials in these areas form a poor foundation base because of low bearing strength, compressibility or liquefaction potential; pillings or some other means of stabilizing the buildings will probably be necessary based on individual building plans and supporting engineering studies. The Colma Formation is the usual foundation base for highrise buildings in the area. However, buildings will be designed to structural standards which are specified in the San Francisco Building Code.

The convention center would require the most excavation: an estimated 630,000 cubic yards of earth, an area which measures approximately 850 feet by 570 feet, and a depth of -22 feet (below San Francisco datum). The dewatering (the pumping out of water from a construction site) of the convention center site and other highrise building sites might produce some local subsidence but there would probably be no impact on most buildings. Generally, ground subsidence from dewatering operation affects a relatively large area. Therefore, a building would settle evenly and it would not be damaged by the movement. On the other hand, ground subsidence or land sliding into a large opened excavation could cause considerable damages to nearby buildings. To protect older brick and masonry buildings and buildings which are historical such as St. Patrick's Church and the Jessie Street Substation, the foundation of these buildings must be underpinned prior to the start of excavation. The requirement for such underpinning shall be specified in the HUD Land Disposition Agreements. Soils engineer's investigation relative to the opened excavation and building construction shall determine the probability of land sliding and whether underpinning of nearby buildings is needed.

The southeastern portion of YBC in SB-3 and SB-4, a site in which bedrock outcrops at or near the surface, would form a stable foundation base for the planned industrial and parking structures. The southwestern portion of the project area, including parts of SB-2 and WB-3 and all of SB-1, is a site of weak foundation material and potential subsidence. The structural engineering of housing in this area would have to take into account the potential instability of artifical fill, sand and bay mud in a major seismic event. Pilings, grouting to bedrock, or some other stabilization method would probably be required.

The greatest potential earthquake hazard would likely be in the southwestern portion of the project area where liquefaction and subsidence might occur. Reinforced concrete buildings in the area might be structurally damaged by a major earthquake (an earthquake with a Richter magnitude of 6 or greater) but collapse would not be anticipated. Damage from a major earthquake is likely to be less severe elsewhere in YBC where ground shaking would be less intense and subsidence and liquefaction potential would be less. Older brick buildings in the area might be damaged with some collapse of walls and cornices. Plans for the apparel mart in CB-2, and the proposed highrise on the Market St. frontage west of the pedestrian concourse in CB-1, indicate that those structures would be built up to the property line, as is used in downtown San Francisco. Such buildings are Risk Level 2 structures in the Community Safety Plan; under the guidelines of Policy 1 of the plan it is stated that, "Failure of mechanical or architectural elements ... should not cause loss of life" (Community Safety Element, San Francisco Department of City Planning, 1974, p. 41). To prevent the fall of debris from the facades of these structures, they must be built in conformity with the Community Safety Plan. If lateral landsliding occurred, water mains and pipes and other underground utility lines might be broken. Streets might buckle or crack in the portion of YBC (about 90%) which is built upon unconsolidated sediments.

The greatest loss of life and injury from an earthquake probably would occur if a major earthquake occurred during the daytime when workers would occupy the offices, retail-commercial, light industrial and downtown support buildings.

If a major earthquake should occur during construction of buildings, there is a potential hazard for collapse of excavation pit walls and liquefaction of the sands and muds of the area. Quicksand conditions might occur locally.

A possible hazard from lateral movement of geologic materials, particularly the bay mud, could occur during excavation of a building site. Such movement could occur because of the exposure of a free face in the pit wall. The weight of the overlaying earth materials and buildings could exert a pressure upon the muds which would initiate a movement into the pit. The mud, in effect, would be squeezed out into the excavation pit. Such lateral movement could occur at any time, but the hazard would be greatest if the material were saturated with groundwater or if an earthquake occurred.

No major impacts are anticipated should the Redevelopment Agency select any or all of the "permitted" variant uses. A smaller area would be excavated if a recreation/entertainment park is constructed in the western two-thirds of CB-2 instead of the office-commercial entertainment-hotel complex. Its development on the roof of the convention hall in lieu of the passive park should present no problem of a seismic or geologic nature.

Selection of the "permitted" housing sites would result in a larger residential population and a somewhat lower daytime office worker population in the YBC area than the designated uses. Thus, a large earthquake could pose more of a nightime hazard to personal safety and less of a daytime hazard that would be the case with the designated uses.

<u>Mitigation</u>

The following mitigation procedures would apply to all development whether a designated or "permitted" use.

- Buildings would be designed in conformance with the San Francisco Building Code, Article 23, Sections 2314A to K, to withstand damage resulting from the ground motions which might occur during the maximum probable earthquake. For buildings which are six stories and higher, the anticipated interaction between the site and the structural frame during a major earthquake must be considered in the design. The San Francisco Bureau of Building Inspection requires that building designs meet these criteria.

- To insure adequate foundation support for proposed new structures, a licensed soils engineer will be retained by each developer to investigate the site and prepare recommendations based on current soils engineering practice as required by the Seismic Safety Element of the San Francisco Comprehensive Plan. The required soils studies for the convention center are now in progress. All buildings would be designed in accordance with the soils engineer's recommendations and reviewed by city engineers and HUD engineers on HUD assisted buildings.

- Periodic checks of structures in and adjacent to the site will be requested of the San Francisco Bureau of Building Inspection to determine if settlement were occurring in areas subject to potential subsidence and to differential settlement. Building inspection is conducted ordinarily only after a complaint has been filed with the Bureau of Building Inspection.[12]

- All buildings would be designed and positioned in conformity with the policies of the San Francisco Community Safety Plan. Highrise buildings would be designed or positioned to minimize the fall of debris and glass onto sidewalks, streets or other areas where people are likely to gather. New office towers would be set back from the street above the second story of the structure. The City Planning Department reviews these building plans.

- Erodible, unconsolidated geologic materials exposed during construction would be protected from wind erosion. The HUD Land Disposition Agreements for YBC must include provisions for dust control and erosion measures. These provisions shall include watering or other construction-industry-accepted methods. Clays and silt might be a source of dust in the area. The ground surface could be wetted down with reclaimed water.

The following mitigation measures refer to construction of the convention center and other buildings which require excavation.

- Excavation pit walls would be shored up and protected from slumping or lateral movement of earth materials into the pit. Dewatering would be done to prevent liquefaction and flooding in the pit. The contractor would comply with the Excavation Standards of the California Occupational Safety and Health Agency (Department of Industrial Relations). The construction contractor, Turner Construction Company, plans to use shoring and sheeting with "soldier beams" for this purpose.[13]

- The excavation pit would be surrounded by a single fence as a safety measure as required by the San Francisco Building Code. The construction contractor has indicated his intention to fence off the construction site and to use a shoring technique which would minimize the possibility of collapse of the pit wall.[13]

NOTE: These mitigation measures are in compliance with San Francisco Ordinances and will be reviewed and monitored by means of established City permit and inspection procedures.

FOOTNOTES

1 Appendix J contains information on which this section is based.

2 U.R.S. and Arthur D. Little Company, 1973, Draft Environmental Impact Report, Yerba Buena Center Public Facilities and Private Development, prepared for the City and County of San Francisco, p. V-L-1.

3 U.R.S. and Arthur D. Little Company, op cit, p. V-L-6.

4 U.R.S. and John A. Blume Associates, 1974, San Francisco Seismic Safety Investigation, prepared for the City of San Francisco, p. 13.

5 Wood, H.O., 1908, "Isoseismals: Distribution of Apparent Intensity in the California Earthquake of April 18, 1906", in Report of the State Earthquake Investigation Committee, Carnegie Institution of Washington.

6 U.R.S. and John A. Blume Associates, op cit., p. 4.

7 U.R.S. and John A. Blume Associates, op cit., p. 5.

8 U.R.S. and John A. Blume Associates, op cit., p. 6.

9 Youd, T. L., and S. N. Hoose, 1976, "Liquefaction during 1906 San Francisco Earthquake", Journal of the Geotechnical Engineering Division ASCE, Vol. 102, No. GT5, Proceedings Paper 12143, May 1976, p. 425-439.

10 Bonilla, M. G., and J. Schlocker, 1966, "Field Trip San Francisco Peninsula," in Geology of Northern California, Bulletin 190, California Division of Mines and Geology, pp. 441-452.

11 Garcia, A. W., and J. R. Houston, 1975, Type 16 Flood Insurance Study, Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound, Technical Report H-75-17, Hydraulics Laboratory, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

12 B. Fisher, Plan Check Engineer, San Francisco Bureau of Building Inspection, telephone communication, December 8, 1977.

13 R. Dorais, Turner Construction Company, telephone communication, December 8, 1977.

HYDROLOGY

Environmental Setting

There are currently no water courses, springs or lakes in the YBC area. The area is low-lying and under natural drainage would receive the surface runoff from the surrounding areas to the north and east. Surface runoff is generally greatest during the wet-weather winter months and least during the summer dry-weather period.

No part of San Francisco is considered to be in a flood plain zone,[1] and a flood hazard boundary map has not been issued by H.U.D.[2] Studies conducted by the City of San Francisco and rainfall records indicate that no major flooding in the YBC area has occurred since 1944, when record keeping began.[3]

The groundwater table in the area ranged from 8-13 feet below the surface in 1964; that is, near sea level.[4] Intentional dewatering during large-scale construction and subsequently to prevent floor buckling and flooding lowered the water table. During construction of the BART subway stations at Powell and Montgomery Streets (near YBC) the groundwater table was lowered to 70 feet below the surface with no adverse permanent effects upon nearby buildings.[5] A soils report indicates: "Readings taken on Natoma Street between New Montgomery Street and Third Street were at elevation -26 in January of 1970, and are presently (1972) at elevation -16" (elevations are with respect to the San Francisco datum which is 8.7 ft. above mean sea level, so that -16 means 7.3 ft. below sea level).[6]

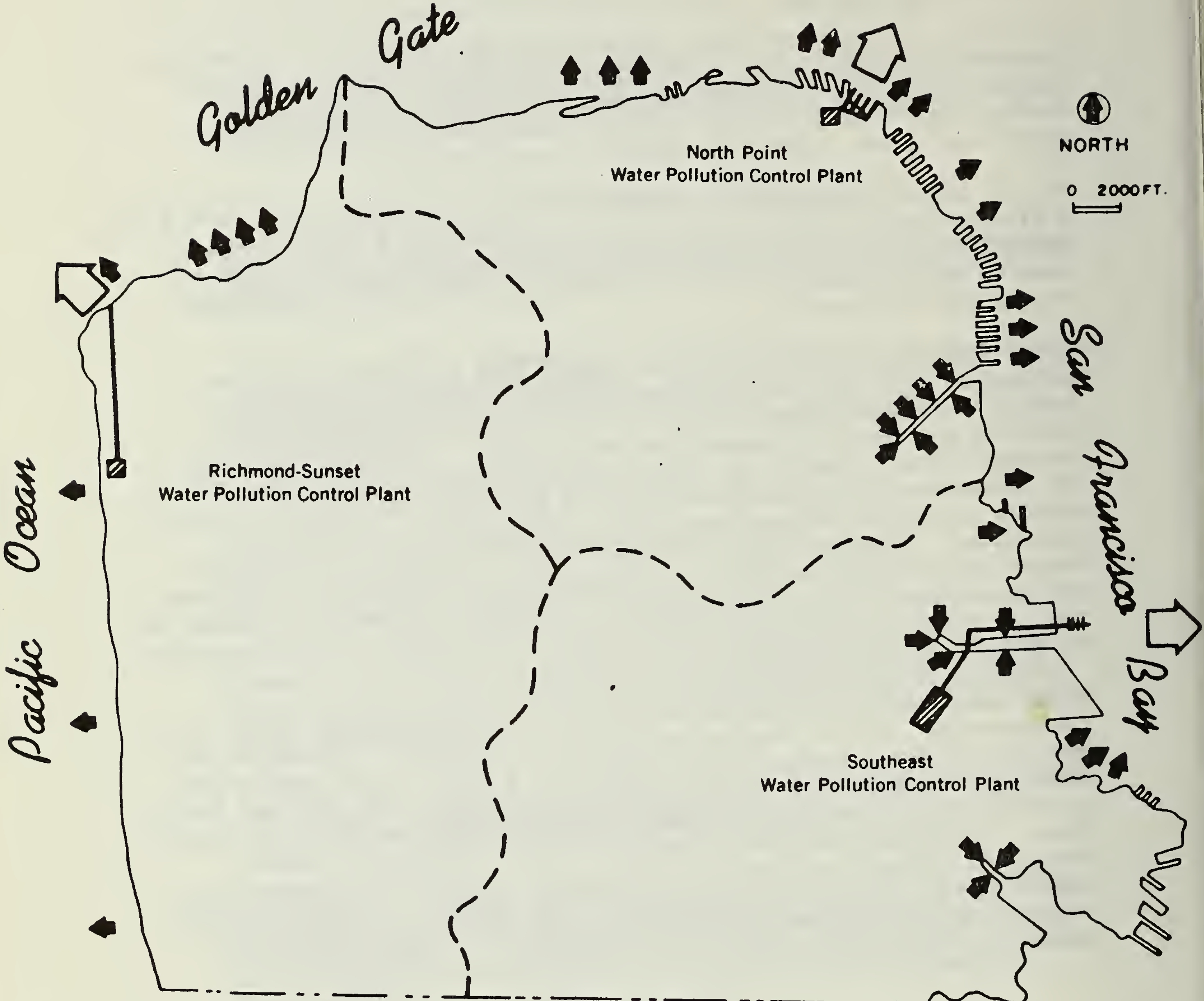
Salt water from San Francisco Bay penetrates some distance inland from the shoreline, but it does not reach YBC. The seawall restricts the movement of the saltwater. The seawall is a structure of rubble and fill which extends from Fort Mason to China Point. The wall was built to protect the artificially filled land from wave erosion at the shoreline. The engineering of the seawall varies in different areas. Between the seawall and YBC, the bay mud is relatively impervious and resistant to movement of groundwater or sea water. The sand deposits are permeable; groundwater migrates through and is retained in such material. There are no wells on the site.

WASTEWATER SYSTEM

The City of San Francisco has for some time discharged its treated wastewater flows to the Pacific Ocean and to San Francisco Bay. Daily, during the dry season, almost 100 million gallons (MGD) of wastewater is collected and transported to three treatment plants which are situated on the periphery of the City. These flows are then treated by advanced primary methods which remove from 40% to 50% of the suspended solids.

FIGURE 1

EXISTING FACILITIES



Presently the City is divided into three drainage districts (indicated by the broken line) which follow the topographical features of the City. Each of the districts is served by a Water Pollution Control Plant which provides primary treatment with chemical addition before discharge of the effluent through an outfall (represented by the large arrows). Located around the perimeter of the City are 40 bypass locations (represented by the solid arrows) where a combination of untreated domestic wastewater and stormwater overflow into the Bay and Ocean when rainfall exceeds 0.02 inches per hour. Overflows occur approximately 80 times per year.

During storms, the street runoff which occurs is collected and transported by the same system used to collect and transport domestic dry-weather flows. The existing sewerage system is large enough for dry-weather flows but too small to contain and treat wet-weather flows. When rainfall exceeds 0.02 inches per hour, however, the runoff combined with the domestic flow exceeds the City treatment capacity and overflows occur.

Located around the City are 40 overflow structures (illustrated by Figure 1) which permit discharge of the combined wastes that exceed treatment plant capacities. Several of these structures are located in the City's beach areas and, when overflows occur, wastewater constituents including fecal material and sewage debris, are deposited on the beaches, rendering them unfit for human use during most of the winter months.

Increased public concern over damage to the environment and demands of State and Federal regulatory agencies motivated the San Francisco Department of Public Works to perpare a master plan for correcting the deficiencies of the existing wastewater collection and treatment system. The resulting plan, known as the San Francisco Wastewater Management Master Plan (SFWWMMP), was first conceptualized in 1971.

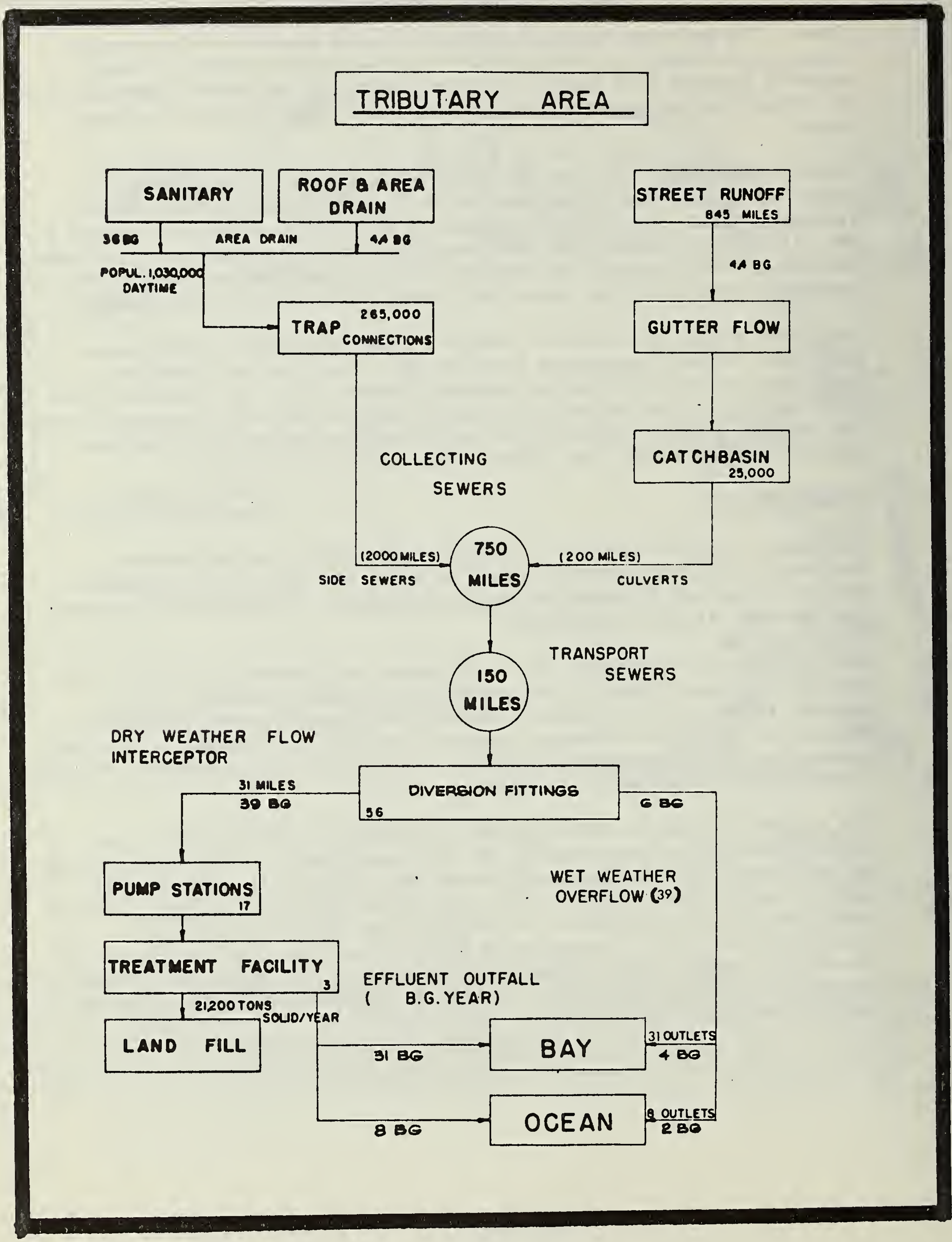
THE MASTER PLAN

The Master Plan is a series of interrelated public works sewerage projects, which have been designed to bring the City into compliance with existing and foreseeable regulatory agency standards for dry- and wet-weather effluent discharges.

The Plan has been designed (1) to increase and upgrade the City's dry-weather treatment capacity to accomplish secondary removal; (2) to provide storage for wet-weather flows which, during storm conditions, exceed the system's treatment capacity; and (3) to utilize a real time, automatic control system to maximize utilization of the system's storage transport and treatment facilities.

The combined storm and sewer system is designed to handle the storm runoff which might occur during the five-year storm. A five-year storm is the largest storm which could occur in a geographic area approximately once in five years, or has a probability of one in five (20%) of occurring in any given year. Similarly, the 100-year storm has a probability of 1% of occurrence in a given year and is often called the 1% storm. During large storms, the capacity of the sewer and storm drain system is exceeded which results in the previously overflows of sewage into San Francisco Bay.

FIGURE 2



TRIBUTARY AREA
SANITARY
ROOF & AREA DRAIN
STREET RUNOFF
845 MILES
36 BG
AREA DRAIN
4.4 BG
POPUL. 1,030,000
DAYTIME
4.4 BG
TRAP
265,000
CONNECTIONS
GUTTER FLOW
CATCHBASIN
25,000
COLLECTING
SEWERS
(2000 MILES)
SIDE SEWERS
750
MILES
(200 MILES)
CULVERTS
TRANSPORT
SEWERS
150
MILES
DRY WEATHER FLOW
INTERCEPTOR
31 MILES
39 BG
DIVERSION FITTINGS
56
6 BG
PUMP STATIONS
17
WET WEATHER
OVERFLOW (39)
TREATMENT FACILITY
3
EFFLUENT OUTFALL
(B.G. YEAR)
21,200 TONS
SOLID/YEAR
LAND FILL
BAY
31 OUTLETS
4 BG
31 BG
OCEAN
8 OUTLETS
2 BG
8 BG

During periods of intense rainfall in large storms, excess runoff which does not drain into the storm drains flows in the streets as it does in cities which have no storm drain system. In addition, light waste matter which is normally contained in the sewer lines could sometimes surface through popped manholes and catchbasins.[8] For example, during peak flows in 50- and 100-year storms, raw sewage might flow in low-lying streets of the area until the storm subsided.[9] The sewage would be diluted by the runoff, but a potential health hazard would exist. It is likely that some catchbasins would be clogged before such storms and ponding would be expected in low-lying areas.

EXISTING SEWERAGE FACILITIES

In 1964 the sewers throughout San Francisco were inventoried and categorized. A summary of that report indicates that about 80% of the City's sewers were constructed before 1938 and 29% before 1892, and that about 50% of the major transport lines were inadequate (unable to convey a five-year storm flow). Many of the transport systems situated within the North Point service district are inadequate.

A second condition in evidence throughout the North Point district is the incidence of interconnected sewer areas. These large flat sewers, which have poor quality flow characteristics, and are connected at virtually every street intersection, are greatly influenced by storm-water flow.

Each of these factors (inadequate transports and interconnected collector sewers) contribute to occasions of local flooding under severe storm conditions at several locations throughout the North Point Sewerage District.

The existing combined sewerage system must transport, treat and dispose of both dry weather flows and bombined wet weather flows. To function under the extreme ranges encountered under the dual regimen of wet weather conditions, the system was originally arranged and sized to accommodate the wet weather flow conditions primarily. Figure 2 shows a block diagram of the system.

The City is divided into three sewerage service areas, each of which is presently served by a primary sewage treatment plant.

The three plants are the North Point Water Pollution Control Plant, Richmond-Sunset Water Pollution Control Plant and Southeast Water Pollution Control Plant. The location of each of the plants and its outfall, together with the approximate area it serves, is shown on Figure 1. Within each service area of each plant are varied land uses and population densities.

The following is a summary of the existing conditions at the North Point and Southeast Water Pollution Plants affected by the proposed Yerba Buena Center project area.

North Point Water Pollution Control Plan (NPWPCP)

The North Point Water Pollution Control Plant serves an area of 7,500 acres. The tributary area includes residential, commercial and industrial land use areas. The plant now provides a chemical primary treatment consisting of pre-chlorination, screening, grit removal, preaeration and primary sedimentation with chemical coagulation using ferric chloride and postchlorination. Flows exceeding plant capacity are bypassed directly to San Francisco Bay without any treatment at 17 locations. The primary effluent does not meet the National Pollution Discharge Elimination System (NPDES) and Regional Water Quality Control Board (RWQCB) discharge requirements.

Southeast Water Pollution Control Plant (SEWPCP)[10]

The Southeast Water Pollution Control Plant serves a dry weather flow area of approximately 10,150 acres in San Francisco and 1,990 acrea of San Mateo County. The plant serves the heavy industrialized area situated in the southeast corner of the City of San Francisco.

The Southeast Plant can be more accurately described as two separate treatment plants at a single site. One is a conventional primary treatment plant serving the southeast tributary area and the other provides solids treatment for solids generated at the Southeast as well as North Point Plants.

The Southeast primary treatment plant consists of pre-chlorination, screening, influent pumping, grit removal preaeration and primary sedimentation, postchlorination and effluent disposal with provisions for the addition of chemical coagulants. Storm flows in excess of plant capacity are bypassed directly to San Francisco Bay through 14 diversion points. The effluent does not meet NPDES and RWQCB discharge requirements.

Existing System Operation

1. Dry Weather

   a. Normal - Dry weather flow in each of the districts transported by sewers to each of the 39 outfall systems along the periphery of the City. Each of the systems has at least one diversion fitting which directs dry weather flow to an interceptor for routing to a district treatment plant. In some areas, pump stations are required to lift the sewage for transport to the treatment plant. The North Point and Southeast Plants discharge treated sewage or effluent to the Bay while the Richmond-Sunset Plant discharges to the Golden Gate Straits.

b. Failure - Gravity portions of the system are very reliable and subject to minimum failure. However, if any one of the pump stations fail, there will be an overflow from the portion of the system served. If a district treatment plant fails, all the sanitary flow from that district will be bypassed untreated. There is limited flexibility to divert flow to other plants for treatment.

2. Wet Weather

a. Normal - During light rainfalls of less than 0.02 inches per hour, the system acts essentially the same as described under dry weather. When a period of heavier rain occurs, exceeding approximately 0.02 inches per hour, the capacity of the treatment plants and interceptor sewers is overcome. Flow backs up in each system and discharges at each affected outfall or comingled water ponding in streets occurs.

b. Failure - Failure of the system results in the dischaage of untreated combined flow to the receiving waters. In addition, the surcharging of portions of the system during heavy rainfalls causes localized flooding and property damage.

c. Flexibility - The existing system is virtually inflexible. Wet weather flow is extremely variable in time, space and intensity. The system does not have the inherent capacity to absorb these variations.

Future Facilities

The North Shore Outfalls Consolidation Program (San Francisco Wastewater Management Master Plan, Implementation Program) would be comprised of three construction elements.

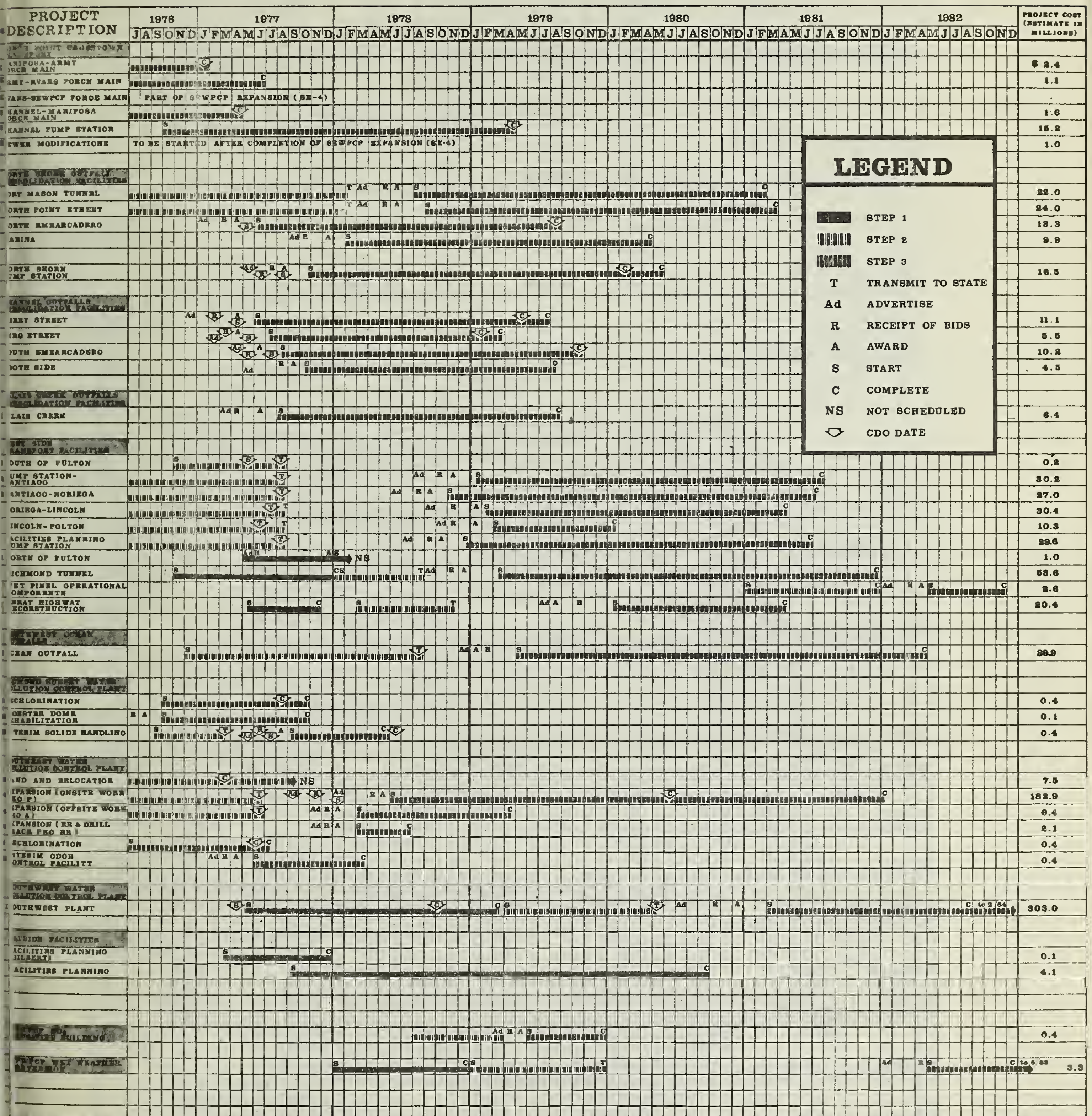
The following attached chart shows the wastewater program construction schedule which is dated November 14, 1977, and is current within 60 days. Also shown is the majority of the program features and the program costs. (Exhibits 3, 4 and 5).

The objective of the proposed North Shore Outfalls Consolidation Program project is the reduction of combined sewate overflows to San Francisco Bay.

The proposed project seeks to meet this objective by construction of facilities which, in concert, would be capable of impounding wet-weather runoffs that exceed the system's treatment capacity and would provide the advantages of: (1) reduced construction impacts (when compared to the retention basins scheme), (2) employment of a technology that is

EXHIBIT #3

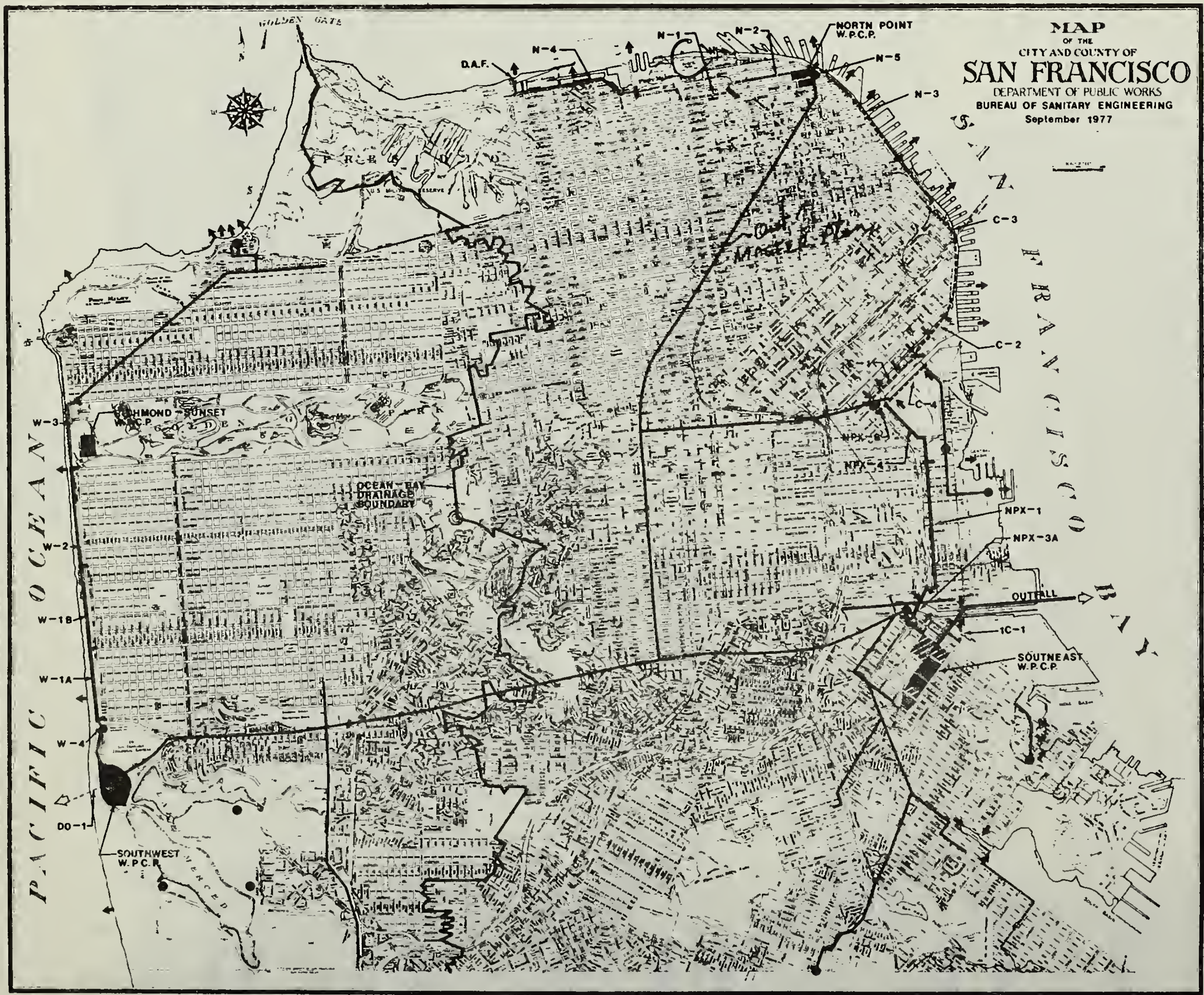
SAN FRANCISCO WASTEWATER PROGRAM SCHEDULE



NOVEMBER 14 1977

PREPARED BY : BUREAU OF SANITARY ENGINEERING
M.E CONRAD
DRAFTED BY : A. ETHELEY

EXHIBIT 4



LEGEND

- UNDER DESIGN
- DESIGNED
- UNDER CONSTRUCTION
- CONSTRUCTED
- TENTATIVE CONCEPTS
- OUTFALLS

MAP REF.	PROPOSED CONSTRUCTION CONTRACTS AND SUPPORTING DOCUMENTS
	NORTN POINT CROSSTOWN
NPX-1	INDIANA STREET FORCE MAIN
NPX-3A	FORCE MAIN EVANS TO ARMY
NPX-3B	FORCE MAIN
NPX-4	FORCE MAIN, PUMP STATION TO INDIANA
NPX-6	CNANNEL PUMP STATION
	NORTH SNORE OUTFALLS CONSOLIDATION
N-1	FORT MASON TUNNEL
N-2	NORTH POINT STREET
N-3	NORTN EMBARCADERO
N-4	MARINA
N-5	NORTN SHORE PUMP STATION
	CHANNEL OUTFALL CONSOLIDATION
C-1	BERRY
C-2	KING
C-3	SOUTN EMBARCADERO
C-4	SOUTH SIDE
	ISLAIS CREEK OUTFALLS CONSOLIDATION
IC-1	ISLAIS CREEK SOUTH SIDE
	WEST SIDE TRANSPORT
W-1A	PUMP STA. TO SANTIAGO
W-1B	SANTIAGO TO NORIEGA
W-2	NORIEGA TO LINCOLN
W-3	LINCOLN TO FULTON
W-4	WST PUMP STA. & F.M.
	S.W. OCEAN OUTFALL
DO-1	

EXHIBIT #5

SAN FRANCISCO WASTEWATER PROGRAM COSTS

(FUNDED PROJECTS)

Code	Project Description	Pre-Step 1	Step 1 (Planning) Facility Plan	Step 1 EIR	Step 1 Total	Step 1 Grant Number	Step 1 Grant Project Cost	Step 2 (Design) CCSF	Step 2 Consultants	Step 2 Total	Step 2 Grant Number	Step 2 Grant Project Cost	Step 3 (Construction) Construction (Bid Cost)	Step 3 Contingencies	Step 3 Engineering & Inspection	Step 3 Total	Step 3 Grant Number	Step 3 Grant Project Cost	Project Cost (Millions $)
	[illegible]																		
NPX 1	MARIPOSA-ARMY FORCE MAIN							COMP 228,825	Incl in CCSF	$ 228,825			$ 2,204,459 COMP	NA	$ 79,238 COMP	$ 2,283,697 COMP			2.5
NPX 6A	ARMY-EVANS FORCE MAIN							COMP 78,967	Incl in CCSF	78,967			COMP 861,136	NA	COMP 51,060	COMP 912,196			1.0
NPX 3	CHANNEL-MARIPOSA FORCE MAIN							COMP 246,748	Incl. in CCSF	246,748			COMP 1,376,598	NA	COMP 72,456	COMP 1,448,334			1.7
NPX 4	CHANNEL PUMP STATION							COMP 1,103,378	Incl in CCSF	1,103,000			13,192,992	2,640,000	631,000	16,500,000			17.6
NPX 4-A	CHANNEL PUMP STATION ADD PUMPS & EXTEND F.M.							308,000 TABLE	Incl in CCSF	308,000			PROG. SCH. 5,000,000	1,000,000	200,000 TABLE	6,200,000			6.5
NPX 5	SEWER MODIFICATIONS							131,000 TABLE	Incl in CCSF	131,000			PROG. SCH. 2,000,000	400,000	86,000 TABLE	2,490,000			2.6
	FACILITY WIDE COSTS		$ 36,403 COMP		$ 36,403 COMP			381,505	Incl in CCSF	381,000									0.4
	ADMIN. & GRANT FEE															418,000			0.4
	TOTALS		36,403	(Included in Areawide Plan)		1101	$ 52,000	2,978,000	Incl in CCSF		0740	(Included in Step 3)	24,635,000	4,040,000	1,120,000		0740	$ 32,670,000 (Incl Steps 2&3)	
	[illegible]																		
N 1	FORT MASON TUNNEL							X-1878 (12/76) 1,107,000	Incl in CCSF	1,107,000			X-1878 (12/76) 18,000,000	3,600,000	720,000 TABLE	22,300,000			23.4
N 2	NORTH POINT STREET							861,000	Incl in CCSF	861,000			PROG. SCH. 14,000,000	2,000,000	560,000	17,400,000			13.2
N 3	NORTH EMBARCADERO							X-1878 (12/76) 1,107,000	Incl in CCSF	1,107,000			AW 11,693,705	2,340,000	X-2131 454,000	14,500,000			15.6
N 4	MARINA							X-1878 (12/76) 861,000	Incl in CCSF	861,000			AW 7,382,234	1,580,000	315,000 TABLE	9,750,000			10.6
	FACILITY WIDE COSTS		465,193		465,193														0.5
	ADMIN & GRANT FEE															950,000			1.0
	TOTALS		465,193	(Included in Areawide Plan)		1102 Task 1a	211,000 (Incl. ...)	3,936,000	Incl in CCSF		1251	(Included in Step 3)	51,576,000	10,320,000	2,050,000		1256	86,564,000 (Incl Steps 2&3)	
N 5	NORTH SHORE PUMP STATION							(11/75) 663,500	45,000	708,500			13,924,681	2,780,000	AW 344,000	17,000,000			17.7
	ADMIN. & GRANT FEE															249,000			0.2
	TOTALS		INCLUDED	IN	ESOC	1102 Task 1a	(Included in ...)	664,000	45,000		1251	(Included in Step 3)	13,924,681	2,780,000	344,000		1249	27,771,600 (Incl Steps 2&3)	
	[illegible]																		
C 1	BERRY STREET							X-1878 (12/76) 1,056,000	Incl in CCSF	1,056,000			AW 3,897,078	1,780,000	X-2131 340,000	11,000,000			2.1
C 2	KING STREET							X-1878 (2/76) 113,000	Incl in CCSF	113,000			AW 4,685,713	940,000	X-2131 202,000	5,870,000			6.0
C 3	SOUTH EMBARCADERO							X-1878 (12/76) 1,190,000	Incl in CCSF	1,190,000			AW 9,079,795	1,620,000	323,000 TABLE	10,999,000			11.2
C 4	SOUTH SIDE							X-1878 (8/77) 245,000	Incl in CCSF	245,000			AW 3,719,610	744,000	X-2131 190,000	4,650,000			4.9
C 5	SEWER MODIFICATIONS							116,000 TABLE	Incl in CCSF	116,000			PROG. SCH. 1,600,000	320,000	71,000 TABLE	1,990,000			2.1
	FACILITY WIDE COSTS		176,907		COMP 176,907														0.2
	ADMIN & GRANT FEE															503,000			0.5
	TOTALS		176,907	(Included in Areawide Plan)		1102 Task 1a	85,000	2,720,000	-		1251	(Included in Step 3)	27,000,000	5,000,000	1,170,000		1248	72,687,000 (Incl Steps 2&3)	
	[illegible]																		
IC1	ISLAIS CREEK							X-1878 (1/77) 275,000		273,000			AW 7,057,859	1,410,000	X-2131 324,000	8,790,000			9.1
IC2	SEWER MODIFICATIONS							76,000 TABLE	Incl. in CCSF	76,000			PROG. SCH 1,000,000	200,000	46,000 TABLE	1,250,000			0.1
	FACILITY WIDE COSTS		127,791		COMP 127,791														0.1
	ADMIN & GRANT FEE															145,000			0.1
	TOTALS		127,791	(Included in Areawide Plan)		1102 Task 1a	68,000	349,000			1251	(Included in Step 3)	3,100,000	1,610,000	370,000		1251	20,472,000 (Incl Steps 2&3)	
	WEST SIDE TRANSPORT [illegible]																		
W1A	PUMP STATION-SANTIAGO							X-1878 (8/77) 1,499,000	50,000	1,550,000			PROG. SCH 27,400,000	5,480,000	1,100,000 TABLE	34,000,000			35.5
W1B	SANTIAGO-NORIEGA							X-1878 (8/77) 1,320,000	50,000	1,370,000			PROG. SCH 25,000,000	5,000,000	1,000,000 TABLE	31,000,000			32.4
W 2	NORIEGA-LINCOLN							X-1878 (8/77) 1,500,000	50,000	1,550,000			X-1878 25,200,000	5,040,000	1,000,000 TABLE	31,200,000			32.8
W 3	LINCOLN-FULTON							X-1878 (8/77) 474,000	50,000	520,000			PROG. SCH 7,300,000	1,460,000	290,000 TABLE	9,050,000			9.6
W 4	PUMP STATION & FORCE MAIN		X-1878 (8/77) 489,000	NA	489,000			X-1878 (8/77) 171,000	1,606,554 CONT	1,780,000			X-1878 (8/77) 24,000,000	4,800,000	950,000 TABLE	29,750,000			32.0
W 5	RICHMOND TRANSPORT		X-1878 (8/77) 1,000,000	-	1,000,000			3,469,000 TABLE	-	3,470,000			PROG. SCH 56,400,000	11,300,000	2,260,000 TABLE	70,000,000			74.5
W 7	FINAL OPERATIONAL COMPONENTS							X-1878 (8/77) 92,000	-	90,000			PROG. SCH 2,300,000	460,000	92,000 TABLE	2,850,000			2.9
W 6	LAKE MERCED TRANSPORT			500,000	500,000			4,100,000 TABLE	Incl in CCSF	4,100,000			PROG. SCH 66,600,000	13,300,000	2,660,000 TABLE	82,600,000			87.2
W E	GREAT HIGHWAY RECONSTRUCTION		24,900 CONT		24,900			1,562,000 TABLE		1,560,000			PROG. SCH 25,400,000	5,080,000	1,320,000	31,500,000			33.1
	FACILITY WIDE COSTS			473,120 CONT															0.5
	ADMIN & GRANT FEE									229,000						4,500,000			4.7
	TOTALS		1,514,000	973,000		1102 Task 1?	6,400,000	14,200,000	1,800,000		1253 Part of	[illegible] Cost Grant	260,000,000	51,000,000	10,400,000				
	[illegible]																		
OO1	OCEAN OUTFALL		COMP 927,429	(Included in Areawide Plan)	COMP 927,429			X-1878 (10/77) 145,000	PROG. SCH 9,500,000	9,645,000			PROG. SCH 77,000,000	15,400,000	PROG. SCH 5,500,000	97,900,000			108.0
	ADMIN & GRANT FEE									48,000						487,000			0.5
	TOTALS					1102 Task 3(?)	902,000	145,000	9,500,000		1252	8,145,000	77,000,000	15,400,000	5,500,000				108.5
	RICHMOND-SUNSET WATER POLLUTION CONTROL PLANT																		
RS1	DECHLORINATION							X-1878 40,095	-	40,000			AW 336,299	67,000	AW 20,000	423,000			0.5
RS2	[illegible]							X-1878 20,200		20,000			AW 76,800	15,000	AW 7,000	99,000			0.1
RS3	INTERIM SOLIDS HANDLING							X-1878 (8/77) 13,900	159,436	172,000			AW 274,526	55,000	AW 36,000	366,000			0.5
	FACILITY WIDE COSTS		COMP 63,992		COMP 63,992														0.1
	ADMIN & GRANT FEE															6,000			NEGL
	TOTALS		63,992	(Included in Areawide Plan)		1102 Task 1	35,000	73,985	159,436		1098	(Included in Step 3)	637,615	137,000	63,000		1098-010 1098-110	1,168,000 973,000	
	[illegible]																		
SE?	LAND AND RELOCATION									PROG. SCH 11,000,000									11.5
SE4	EXPANSION (ONSITE WORK) PRO PI							X-1878 (10/77) 2,640,000	5,800,000	8,400,000			X-1878 (10/77) 152,700,000	30,500,000	X-1878 (10/77) 6,230,000	199,000,000			188.4
SE4	EXPANSION (OFFSITE WORK)							(Included in Contract P)					AD 4,022,344	804,000	261,000	5,087,000			5.1
SE4	EXPANSION (PS & OUTFALL)							(Included in Contract P)					BID 1,429,790	286,000	AD 84,000	1,800,000			1.5
	INDICATOR PILE CONT							(Included in Contract P)					BID 225,000	45,000		288,000			0.3
	FACILITY WIDE COSTS		COMP 2,357,527		COMP 2,357,527											3,000,000 Env. Mitigation			5.4
	ADMIN & GRANT FEE									118,000						2,830,000			2.9
	TOTALS		2,357,527	(Included in Areawide Plan)		1102 Task [illegible]	1,978,000	7,640,000	5,800,000		1099-010	13,230,000	158,400,000	31,600,000	7,090,000				
SE8	INTERIM ODOR CONTROL FACILITY							X-1878 50,000	NA	50,000			AW 330,800	61,160	X-2131 20,000	417,000			0.5
	ADMIN & GRANT FEE															6,000			NEGL
	TOTALS		Included in	[illegible] WPCP Expansion	(See above)			50,000	-		1099-010	(Incl in Step 2 for ...)	331,000	66,000	20,000		1099-020	354,000	
	[illegible]																		
SW1	SOUTHWEST PLANT		X-1878 (4/77) 3,071,000	346,222 CONT	3,418,000			X-1878 (4/77) 12,600,000	NA	12,600,000			PROG. SCH 210,000,000	42,000,000	8,400,000 TABLE	260,400,000			270.[illegible]
	ADMIN & GRANT FEE				43,000					176,000						3,650,000			3.9
	TOTALS		3,071,000	346,000		1249	2,510,000	12,600,000			NONE	NONE	210,000,000	42,000,000	8,400,000				
	NORTH POINT WPCP WET WEATHER CONVERSION																		
	WET WEATHER CONVERSION		X-1878 (7/77) 58,700	-	58,700			UNK	UNK	UNK			UNK	UNK	UNK	UNK			0.1
	ADMIN & GRANT FEE																		NEGL
	TOTALS		58,700			NONE	NONE				NONE	NONE					NONE	NONE	
	BAYSIDE FACILITIES																		
	BAYSIDE FACILITIES		PROG. SCH. 3,500,000	PROG. SCH 700,000	4,200,000			PROG. SCH 10,000,000		10,000,000			UNK	UNK	UNK	UNK			14.2
	ADMIN. & GRANT FEE				59,000					140,000									0.2
	TOTALS		3,500,000	700,000		1102 1399	1,085,000 2,000,000	10,300,000			NONE	NONE					NONE	NONE	
	AREAWIDE FACILITIES PLANNING																		
	ONGOING AND FUTURE STUDIES		2,000,000		2,000,000														2.0
	OTHER COMPLETED STUDIES				4,183,674			NA	NA	NA	NA	NA	NA	NA	-	NA	NA	NA	4.2
	ADMIN & GRANT FEE				155,000														0.1
	TOTALS					1102 (Not including those shown above)	[illegible]												
	CONSTRUCTION MGMT															20,000,000 EST			20.0
	ADMIN. & GRANT FEE															100,000			0.1
	TOTALS																14[illegible]	5,000,000	
	SEWPCP IMPROVEMENTS																		
SE1	CHLORINATION							X-1878 (7/75) 87,800	-	88,000			AW 337,898	77,530	AW 23,000	439,000			0.6
	COMPLETED CONTRACTS							COMP 621,127		COMP 621,127			COMPLETED			COMP 4,368,000			5.0
	ADMIN. & GRANT FEE															?			?
	TOTALS							709,000	-		0749	(Included in Step 3)	383,000	78,000	23,000		0749	10,501,000	
	NP/SE CHLORINATION																		
	COMPLETED CONTRACTS							46,000 TABLE	NA	46,000			PROG. SCH 740,624	NA	PROG. SCH 107,536	848,000			0.9
	SO. BUILDING							X-1878 (10/77) 61,000	-	61,000			X-1878 (10/77) 600,000	120,000	X-1878 (10/77) 30,000	750,000			0.8
	ADMIN & GRANT FEE															22,000			NEGL
	TOTALS							107,000	-		0440	(Included in Step 3)	1,341,000	120,000	138,000		0440	597,400	
	COMPLETED GRANTS																		
	NORTH POINT WPCP OUTFALL DIFFUSER																0393	669,053	
	[illegible] MACRO[illegible]																0594	1,123,168	
	SF COUNTY JAIL PUMP STATION & FORCE MAIN																07[illegible]	524,240	
	OTHER OLD GRANTS																ALL OLD PROJECTS	5,002,27[illegible]	
	Wastewater Program Totals		Step 1						Step 2						STEP 3		GRAND TOTAL		

LEGEND

SYMBOL DEFINITION SOURCE OF DATA

- COMP = WORK COMPLETED. AMOUNT DETERMINED BY GRANT SECTION
- CONT = CONTRACT AMOUNT
- MIS = MANAGEMENT INFORMATION SYSTEM
- AW = AWARD OF FORMAL CONTRACT
- BID = AMOUNT OF APPARENT LOW BID
- IFP = INVITATION FOR PROPOSALS
- 7/09 = ESTIMATES SENT TO SWRCB
- X-2131 = CONSTRUCTION ENGINEERING COST ESTIMATE
- X-1878 = PROJECT COST ESTIMATE
- TABLE = DESIGN & CONST. ENGINEERING TALBES
- PROG. SCH. = COST SHOWN ON BSE WW PROGRAM SCHEDULE
- NEGL = NEGLIGIBLE
- NA = NOT APPLICABLE
- UNK = UNKNOWN AT THIS TIME

JANUARY 3, 1978

BUREAU OF SANITARY ENGINEERING

1. BASED ON "SAN FRANCISCO WASTEWATER PROGRAM SCHEDULE" DATED JANUARY 3, 1978.
2. FOR DEFINITIONS OF COST CATEGORIES SEE LETTER OF EXPLANATION DATED JANUARY 3, 1978.
3. ALL NUMBERS ROUNDED.
4. COSTS SHOWN HEREWITH ARE COSTS OF PROJECTS FUNDED BY THE 1976 AND EARLIER BOND ISSUES ONLY. COSTS OF ANY FUTURE PROJECTS ARE NOT DEFINED AT THIS TIME.
5. COSTS SHOWN ARE THOSE ACTUAL OR IF ESTIMATED, ESTIMATED AT MID-POINT OF CONSTRUCTION.

PREPARED BY: F. B. ORZAL FBO DATE [illegible]
DRAWN BY: D. V. BLANCH DVB DATE [illegible]
CHECKED BY: V. B. THOYAR [illegible] DATE [illegible]
APPROVED BY: A. O. FRIEDLAND AOF DATE [illegible]

well known (thereby making the control of odors and solids accumulation a relatively normal task of design), (3) reduced construction costs, (4) reduced construction in residential areas, and (5) reduced future maintenance and operational power requirements. Following passage of the storm, these impounded flows would be released to the treatment system for treatment and subsequent discharge.

It is expected that rainfall on the statistical average will be sufficiently intense to exceed the capacity of the completed system at least once a year. When this condition occurs, overflow to the Bay would result. This system's structures would be designed, with baffles, in such a manner that much of the floatable and solid sewage material would be retained by the system for subsequent treatment, rather than being discharged to the Bay.

The concept of storm flow storage and subsequent treatment was selected by the City and County of San Francisco as the most practical and environmentally sound following evaluation of several alternative methods of solution.

Impacts

New construction of large structures and highrise buildings throughtout all but the southeastern portion of the project area (where the surface consists of bedrock outcrops) would require excavation and dewatering. Construction of the underground convention center in CB-3 would require that the water table be lowered to an elevation of -30 (below the San Francisco datum). The water table would be lowered in the surrounding area for a period of about two years. The lowering of the water table during construction is not expected to have a permanent impact on the ground water levels. Temporary saltwater intrusion may occur to some extent during dewatering in the area. Groundwater pumped during the dewatering operations would be channeled into the sewer lines in the area. If the groundwater has much sediment it could deposit sediment in the sewer lines and result in their partial clogging. Partial clogging of the sewer lines could cause sewage backup and spillage. Such spillage would result in seepage of sewage into the soils. As no wells are known to exist in the redevelopment area, such seepage does not cause an adverse health impact in the Redevelopment Area. Therefore, no impact on use of the groundwater is expected.

Building construction as proposed would reduce the amount of permeable soil surface, essentially to that existing before the 1972-73 demolition. Surface runoff would be channeled for the most part into the storm and sewer system. The site would continue to have a potential hazard of stormwater overflows. HUD approval of housing development in YBC may depend upon the City's ability to protect against such overflows and the possible health hazard which might result from the flow of raw sewage in the streets in large storm peak runoff periods.[11]

Selection of the "permitted uses" including the construction of the recreation/entertainment park in CB-2 would create little impact upon the groundwater conditions of the area, while providing for about eight acres of permeable surface in the center of YBC. The apartment housing areas in the eastern, western and southern blocks would have more permeable surface than under the designated uses. The overall impact would be to allow more water to be absorbed by the earth during storm, and less surface runoff into the storm and sewer system. The water table probably would not change much from its present height.

Wastewater System Impacts

Water quality conditions before and after implementation of the proposed project are given in the Table opposite. Conditions would improve by increments between the two sets of figures in this table: some overflow reduction would occur on completion of project construction in 1978. There would be reduction in overflows per year upon expansion of the Southeast Plant, in approximately 1981. After completion of other Wastewater Master Plan programs (1985-1990), the wet-weather flows would be treated at the Southwest Plant and discharged through the Ocean Outfall.

Based on these studies and from rainfall records of the City, it was determined that no flooding in this project area has ever occurred to such a degree that a complaint was issued to the City. Review of weather bureau records show a storm approaching a 50-year frequency in 1946, and another in 1972 which approximated a 100-year storm. These did not flood basements or streets sufficiently to lead to any complaints. The contributing project drainage area, estimated to be 87 acres with an estimated 80% runoff coefficient, does not change with development as proposed. Storm water flows will be comparable to existing conditions along with estimated times of concentration.

It can then be seen that present underground facilities appear to be adequate to handle the normal combined flow without major flooding. However, if direct bypass of comingled waters are not allowed to be dumpted directly into the Bay during heavy storms, the treatment plant could not handle this additional flow and backing and flooding would occur.

The short-term impact of a combined sewer and storm water system will produce flooding of gutters with water comingled with sewage if all storm water during heavy runoff must be processed through the treatment plant.

Mitigation

O Install groundwater observation wells for monitoring the level of the water table and other instruments to monitor settlement and subsidence in the area as recommended by the City's soil engineering

Receiving Water Conditions, Yearly Averages[1]

Characteristic	Present Condition	Channel Outfall Consolidation Fully Operational[2]
Number of overflows	82	4
Untreated Discharge (million gallons)	1,600	130
Suspended solids (million pounds)	7.0	0.5
Chemical Oxygen Demand[3] (million pounds)	4.0	0.3
Grease (pounds)	400,000	30,000
Floatables (pounds)	60,000	4,000
Nitrogen (pounds)	200,000	10,000
Phosphate (pounds)	100,000	6,000

[1]San Francisco Wastewater Master Plan Book of Plates, 15 September 1971: Plates I-12 and V-22.

[2]After completion of expansion of the Southeast Plant, the Crosstown Transport, the Ocean Outfall and the Southwest Water Pollution Control Plant, in approximately 1985-1990.

[3]Chemical oxygen demand (COD): the quantity of oxygen used in biological and non-biological oxidation of materials in water; a measure of water quality.

consultants in their report to the City of October 13, 1972. The construction contractor for the convention center will place observation wells on the perimeter of the convention center site. Some wells could be maintained by the City after construction of the convention center is completed.[12]

0 If in the judgment of City engineers unacceptable subsidence occurs during the construction, they will initiate groundwater recharge to halt the settlement.

0 HUD requirements for housing are as follows:[2] The combination of the storm drain system, the street cross-section and the protective slope around the buildings would render the finished grade of the buildings free of stormwater overflows. In storms up to the magnitude of the 10-year storm, runoff would not be permitted to overflow the curbs; in the 50- and 100-year storms, runoff would not be permitted to overflow the finished grade of housing. Implementation of the wastewater program construction schedule as proposed would not completely eliminate the flooding condition but would reduce it to the maximum extent economically possible under the existing conditions of the combined sanitary and storm sewer systems. During dry weather the nature of the flow would be such that no accumulation of potentially odor-causing material would occur. Settled solids from stored wet-weather flows would be flushed by subsequent dry-weather flows. If the latter should prove to be inadequate, flushing or other systems would be installed by the city.

0 Groundwater pumped from the convention center site would be filtered, if this is found necessary, to prevent sediment from entering the storm-drain-sewer lines. The contractor has indicated his intention of requiring the dewatering contractor to comply with the directives of the Department of Public Works in handling sediment in the groundwater.[1]

FOOTNOTES

[1]A. Brandow, Administrative Engineer, San Francisco Department of Public Works, telephone conversation, August 16, 1977.

[2]J. R. Hunter, Acting Federal Insurance Administrator, letter of October 21, 1975 to the Mayor Alioto.

[3]U. S. Department of Housing and Urban Development, 1974, Final Environmental Impact Statement, Yerba Buena Center, HUD-R09-EIS-74-IF, P. 46.

[4]Youd, T. L., and S. N. Hoose, 1976, "Liquefaction during 1906 San Francisco Earthquake," Journal of the Geotechnical Engineering Division ASCE Vol. 102, No. GT5, Proceedings Paper 11243, May, 1976, p. 425-439.

[5]U.R.S. and Arthur D. Little Company, 1973, Draft Environmental Impact Report, Yerba Buena Center Public Facilities and Private Development, prepared for the City and County of San Francisco.

[6]Dames and Moore, 1972, Foundation Investigations, Yerba Buena Center, Exhibit Hall and Sports Arena, prepared for the City and County of San Francisco.

[7]Final Environmental Impact Report - North Shore Outfall Consolidation - San Francisco Wastewater Master Plan Implementation Project, III - City and County of San Francisco, December 1975.

[8]M. Francies, Associate Engineer, San Francisco Department of Public Works, letter of August 31, 1977.

[9]M. Francies, Associate Engineer, San Francisco Department of Public Works, telephone conversation, August 16, 1977. With respect to ongoing improvements, confirmed by D. Birrer, Engineer, San Francisco Bureau of Sanitary Engineering, telephone conversation, August 17, 1977.

[10]Final Transport-Storage Operational Plan Report San Francisco Wastewater Master Plan, Bureau of Sanitation, Department of Public Works, City and County of San Francisco, June 1976.

[11]H. Blaser, Regional Civil Engineer, U. S. Department of Housing and Urban Development, Sacramento, California, telephone communication, August 26, 1977.

[12]R. Dorais, Turner Construction Company, telephone communication, December 9, 1977.

[13]HUD Handbook, Storm Drainage Design, 4140.1, Chapter 7.

[14]Final Environmental Impact Report, Channel Outfalls Consolidation, San Francisco Wastewater Master Plan Implementation Program VII, City and County of San Francisco, May 1976.

Environmental Setting

The Yerba Buena Center Redevelopment Area is located in the heart of the heavily urbanized setting of the City of San Francisco. Thus, with the exception of a few street trees and weeds in vacant areas, much of the area lacks vegetation entirely.

The redevelopment area as a whole can be characterized as vacant land consisting of paved parking areas or the rubble-strewn foundations of demolished buildings. In about 20 percent of the site where the soil has been left open, invasions of primarily non-native weedy herbs, shrubs, and grasses have occurred. There are also occasional remnants of past landscaping vegetation; the most notable example of this is a fig tree in SB-3 above Verona Place.

In some areas, primarily around the southerly and easterly edges of the site, new structures have been built and some landscaping consisting of street trees and planter strips covering less than 5% of each site has been provided.

The landscaping associated with the Clementina Towers housing development in WB-3 includes lawn grasses and landscaping trees. There is also a garden area in this block on the south side of Clementina Street which produces a variety of fruits and vegetables.

Wildlife under these conditions is substantially restricted; it consists primarily of insects, birds, and rodents. The area supports a Norway rat population which lives in the old sewer lines that were not removed when buildings were demolished, and feeds on food waste from disposals which enters the sewage system.[1]

HUD contacted the staff of the Endangered Species Coordinator in the Regional Office of the California State Fish and Wildlife Service. They indicated that there were no known or suspected rare or endangered species of wildlife in and near the YBC redevelopment area. HUD also contacted the staff of the Regional Office of the Fish and Wildlife Service, U. S. Department of the Interior in Portland, Oregon who confirmed that there were no known or suspected rare or endangered plant species on the site.

In summary, no rare or endangered plant or animal species have been noted on the site. Judging from the habitat, none are considered likely to be associated with it.[2]

Impacts

As noted in Part VI General Approach to the Evaluation of Environmental Impacts, construction effects are expected to occur on a continuing basis over the next ten years, reaching completion (for purposes of this EIS) by 1988. Over the same period of time, some landscaping would occur on portions of the redevelopment area where construction was complete.

Under the current time schedule, construction of the convention center itself (and several other structures) is to be complete by mid 1981, including the initial establishment of a park with landscaping covering eight acres on the surface level of the convention center. This landscaping would probably include about five hundred trees as well as about six acres of lawn, flowerbeds, and shrubs.

By 1988, construction activities are scheduled to have destroyed all of the weedy vegetation in the Redevelopment Area, forcing birds to leave the area and resulting in an overall decline in their numbers proportional to the loss of habitat. Construction activities also would destroy many old sewer lateral lines, forcing the rat population now inhabiting those lines into adjoining structures and (temporarily) stimulating the need for rat control efforts by nearby property owners.

Following construction, vegetation would center on a landscaped pedestrian concourse extending from Market Street to Howard Street (mid-block between Third Street and Fourth Street) and on the surface level of the convention center. Vegetation would probably include about 1,400 trees (assuming that street trees would be placed at 25 foot intervals and that there would be one tree for every 625 sq. ft. of landscaped area) and about six acres of lawn, flower beds and shrubs. Most of the plants would probably be non-native species commonly used for landscaping in the region. Animals under these conditions would be restricted to insects; to birds tolerant of the urban setting, including the domestic pigeon, house finch, English sparrow and Brewer's blackbird; and to common soil animals.

If the Redevelopment Agency selects the "permitted" recreation/entertainment park to be constructed over the convention center instead of the designated public (passive) park use, the total number of trees would drop to about 1,250, and lawn area would also be reduced, resulting in proportional reductions in the wildlife population.

In this instance, vegetation would center upon the one and two-thirds block recreation/ entertainment park, including roughly 11 to 14 acres of landscaped area. Vegetation would include about 1,500 trees (including street trees) and about nine to 12 acres of lawn, flowerbeds and shrubs. Some concepts for development of the recreation/entertainment park would include a botanical garden, which would be likely to include primarily non-native plants. Wildlife under these conditions would be similar to that of the passive park; however, absolute numbers might be somewhat higher due to the greater amount of vegetation.

Selection of any or all of the other "permitted" uses of housing, the parking garage or moving the hotel location would not be expected to have any significant effect upon the ecology (Biota) of the area.

Mitigation

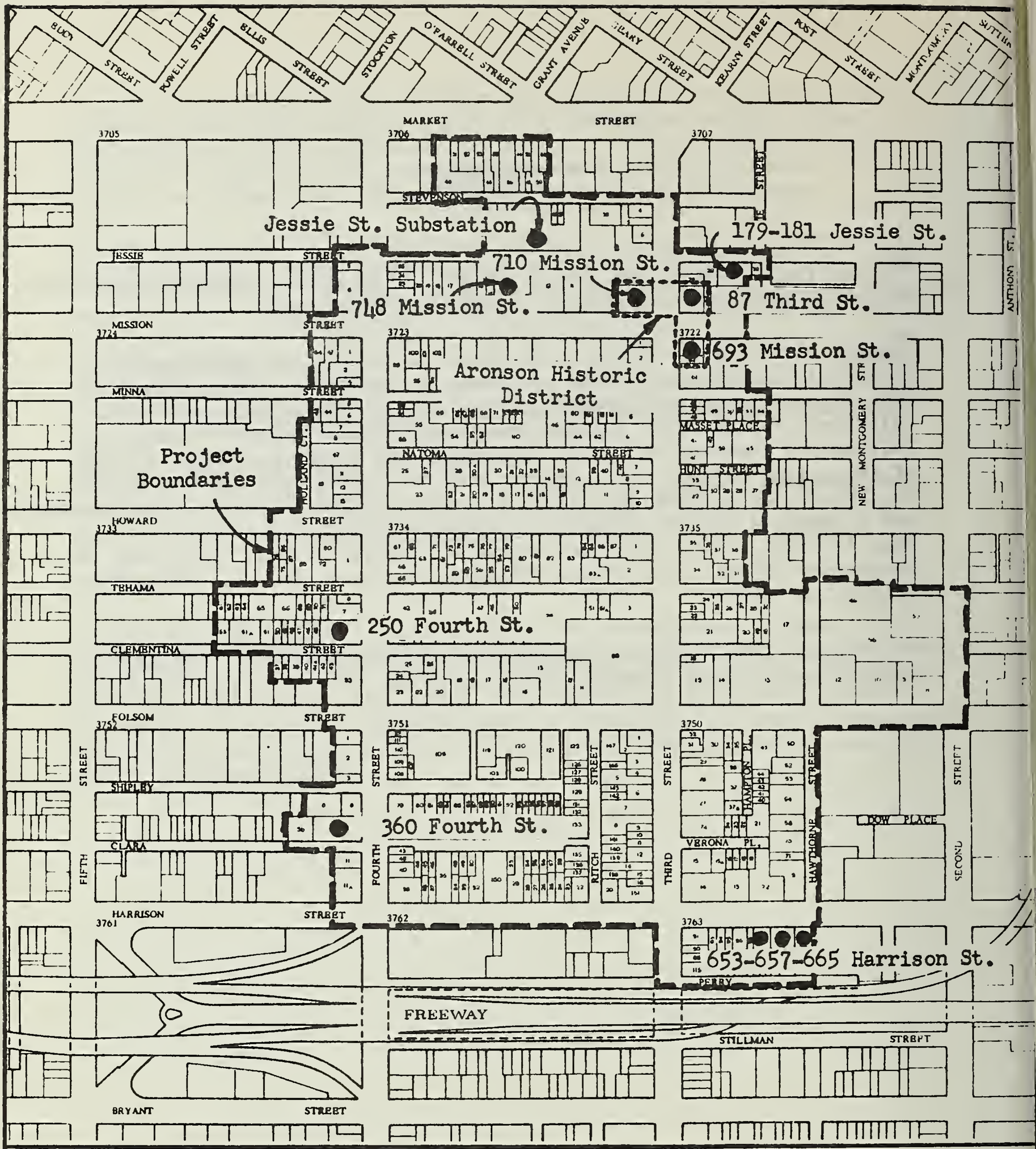
Before the Redevelopment Agency begins the implementation phase of each part of the development of Yerba Buena Center - including any demolition or construction (by means of the disposition agreement or other contract wherever appropriate), the Agency will develop improved rat control procedures in consultation with the U. S. Department of Health, Education and Welfare and present evidence of the development and enforcement of such procedures to HUD.

FOOTNOTES

[1]D. Crociani, Program Manager of Vector Control, San Francisco Department of Public Environmental Health, telephone communication.

[2]Leach, H. R.; J. M. Brode; S. I. Nicola, 1976, At the Crossroads, California Department of Fish and Game, Sacramento. Powell, Robert W., 1974, Inventory of Rare andEndangered Vascular Plants of California, California Native Plant Society Special Publication #1, Berkeley. Smithsonian Institution, 1975, Endangered and Threatened Plant Species of the United States, U. S. Government Printing Office, Washington, D. C., #94-A. U. S. Fish and Wildlife Service, 1976a Proposed List "Endangered and Threatened Species--Plants," Federal Register, Vol. 41, No. 117, June 16, 1976. U. S. Fish and Wildlife Service, 1976b, "Endangered and Threatened Wildlife and Plants," Federal Register, Vol. 41. No. 208, October 20, 1976.

[3]T. Conrad, Chief Planning, Housing and Programming, San Francisco Redevelopment Agency, telephone communication.



YERBA BUENA CENTER

REDEVELOPMENT PROJECT AREA D-1

PROJECT AREA BOUNDARIES

AND SHOWING BUILDINGS HAVING HISTORIC
OR ARCHITECTURAL INTEREST & VALUE

PROJECT AREA BOUNDARY
3700 ASSESSOR'S BLOCK NUMBER
LOT NUMBER

0 FEET 200

PREPARED BY SAN FRANCISCO HUD AREA OFFICE * ENVIRONMENTAL STAFF 1/78

HISTORIC PRESERVATION

Within the YBC Project area, there are eleven buildings which possess historic or architectural interest and value. These have been identified and located on the attached map, and are discussed individually.

NOTE: The National Register of Historic Places (see Appendix N) is the official register of the Nation's historic and cultural resources worthy of preservation. The actions noted in this section have been initiated by HUD with the U. S. Department of Interior, the Advisory Council on Historic Preservation and the California State Historic Preservation Officer. These consultations are occurring concurrently with the public circulation of this DEIS. Final decisions respecting properties eligible for the National Register of Historic Places and Project impacts on eligible and listed properties are to be made pursuant to the National Historic Preservation Act of 1966, as amended. The Final EIS will include information on these consultations.

1. The oldest building is St. Patrick's Church at 748 Mission Street between Third and Fourth Streets. The main facade and tower, faced with red brick, were built in 1872 and survived the earthquake and fire of 1906. The nave and apse were destroyed, and then were rebuilt in the neo-Gothic style which characterized the earlier Church. The present Church has been designated as a landmark by the Board of Supervisors. The (San Francisco) Landmarks Preservation Advisory Board has subsequently recommended that it be placed on the National Register of Historic Places. HUD has found that the building meets the eligibility criteria for the National Register and is in consultation with the State Historic Preservation Officer for its inclusion in the National Register. HUD has also determined that the proposed Redevelopment Project will not adversely affect this property. The church and the adjoining rectory will continue to be used as a parish church of the Archdiocese of San Francisco under an owner participation agreement with the Redevelopment Agency.

2. In the same block and north of the church is the Jessie Street Substation, first built in 1881 to serve the San Francisco Gas and Electric Company. It was enlarged and modified in 1883, 1892 and 1905. Rebuilt in 1907 after the fire and earthquake and expanded in 1909, it was designed by Willis Polk, a San Francisco architect of the late nineteenth and early twentieth century. The south side of the structure, fronting on Jessie Street, exhibits a highly refined arrangement of classical elements on a brick wall, including glazed terra cotta cornices, four cherubs over the classical entranceway, and other decorative forms. The other three walls are rough and unfinished industrial bricks. In September 1974, the Jessie Street substation was placed on the National Register of Historic Places.

On July 9, 1977 the building was recognized by the San Francisco Board of Supervisors as a designated landmark. In June, 1977 the Foundation for San Francisco's Architectural Heritage published the results of its study on the feasibility of adaptive reuse. This report recommended the Jessie Street Substation be a combination of retail and office uses as part of the pedestrian concourse connecting the BART Station with the proposed convention center. No action has been taken on this study by the Redevelopment Agency.

HUD has reviewed the Foundation's study and finds that the concourse development should it occur as proposed, would not have an adverse effect upon this building. Substantial additions would be made to the northern wall, including stairways, elevators, and utility spaces and rest rooms. The interior would be completely remodeled into commercial, retail and office spaces on either side of the mall extending through the building as part of the pedestrian concourse. This concourse would be a well designed complex of plazas and landscaped walkways meandering around, as well as through the substation, and thereby providing an attractive setting for this building. HUD requires that final plans for development of the substation and the pedestrian concourse be submitted for review prior to execution of applicable land disposition agreements.

3. The Mercantile Building (at 710 Mission Street, the northwest corner of Third and Mission Streets) is a ten-story structure constructed in 1904, destroyed by the 1906 earthquake, and rebuilt thereafter. It is a steel and concrete building with a brown brick finish and richly ornamented upper stories. It was designed in the style of the classic early American skyscrapers of Louis Sullivan and others, like a classical column with a base, shaft, and capital. As such it is representative of the Chicago style skyscrapers in the early part of the century. The building is to be rehabilitated under a land disposition agreement between Redevelopment Agency and T/W Associates. This agreement specifies the rehabilitation requirements, which include a 20' addition on the west side, ten stories high to house new elevators and to comply with seismic safety requirements. There will also be a new entry way and lobby. On the north side, a loading ramp will be provided, together with a utility and refuse station space.

   HUD does not find that this building meets the National Resgister Criteria. 1/ However, together with the next two buildings discussed below (at 87 Third Street, and at 693 Mission Street), HUD finds that these three buildings, all at corners of Third and Mission Streets, do form a group which is eligible for inclusion in the National Register as an historic district. (Please see discussion of the "Aronson Historic District.)

4. The building at 87 Third Street (sometimes referred to as the Blumenthal Building), located at the northeast corner of Third and Mission Streets, was constructed in 1911. It is a steel and concrete structure, 5 stories in height, and has been noted by Professor Turner 2/ for its wide "Chicago window" proportions, and for its unusual iron brackets at the fifth floor level. A major fire in 1971 destroyed the upper stories which remain gutted today. The Redevelopment Agency has determined from a study that it is economically infeasible to rehabilitate and has scheduled it for demolition.

   HUD finds that this building, as a single free standing structure, does not meet the National Register Criteria.

5. The Williams building, at 693 Mission Street is currently about 95% occupied by various office tenants. It is a nine story, steel and concrete building constructed "soon" after the earthquake, according to Professor Turner. The cornice is supported by scroll-like moulding. The San Francisco City Planning department has classified it as a vernacular variation of the classical style. The building is typical of the commercial block type architecture of the early century. The Redevelopment Agency has determined that it is economically infeasible to rehabilitate and scheduled it for demolition.

   HUD finds that this building, as a single free standing structure, does not meet the National Register Criteria.

6. The Jessie Hotel, at 179-181 Jessie Street is a four story, Rennaissance style structure designed by the Reid Brothers Architectural firm in 1912. The building was originally used as resident quarters for the servants at the Palace Hotel. It is scheduled to be razed, although the Redevelopment Agency has indicated a willingness to consider retaining it for possible residential use.

   HUD finds that this building does not meet the National Register Criteria.

7. 250 Fourth Street (the Massengil building) has been rehabilitated under an owner participant agreement. This is a relatively new building (1946), and is an example of the International Style as interpreted in an ordered, almost classical way popular in America in the late 1930's and 1940's.

   HUD finds that this building does not meet the National Register Criteria.

8. Property at 360 Fourth Street was acquired by the Salvation Army under an owner participant agreement with the Redevelopment Agency, and is now used as a Senior Citizens Activities center. It was formerly the Southern police station of San Francisco.

This two story building was built in 1925, and according to Professor Turner, is "a pleasing example of the imaginative Spanish Revival style popular at this time -- combining some elements of the California Missions, with lavish ornamental features inspired by the 'Churriguerresque' phase of Spanish Baroque architecture." Special features are the front facade because of its entrance portico in Baroque style, the decorations on either side of it and above the doors of each wing, the front windows' ornamental grill work, and the downspouts located inside the walls. According to the agreement, this building is scheduled to be razed, and the resulting site, together with the adjoining lot to its north (used as a parking lot), is for commercial development, now lacking in the area.

HUD finds that this building meets the National Register Criteria, and is accordingly recommending that it be found eligible for inclusion in the National Register of Historic Places. This recommendation, together with a request for consultation, has been submitted to the State Historic Preservation Officer in accordance with the Procedures for the Protection of Historic and Cultural Properties. In the event that this building is found to be eligible for the National Register, HUD will seek to encourage its retention. The property is under the ownership of the Salvation Army and its retention would involve voluntary agreements by the Salvation Army and the Redevelopment Agency to change the existing agreement.

9. The three adjoining buildings at 653-657-665 Harrison Street have been rehabilitated under an owner participant agreement. They date from the 1930's, and are examples of a later version of the "Moderne" style, using streamlining and other motifs derived largely from European International Style" architecture, according to Professor Turner.

These three Harrison Street buildings are attractive and well maintained, but HUD finds that they do not meet the National Register Criteria.

10. The Aronson Historic District is composed of the three buildings at 710 Mission Street (Mercantile Building, formerly known as the Aronson Building), 87 Third Street, and at 693 Mission Street (Williams Building). These buildings are, respectively at the northwest, northeast, and southeast corners of Third and Missions Streets, and though each is individually ineligible for inclusion in the National Register of Historic Places, HUD finds that as a group, they are eligible for inclusion as an historic district.

Professor Turner has suggested the significance of this group of buildings by commenting as follows: "These three buildings, all built soon after the 1906 fire, are interesting examples of commercial architecture of the period, but are probably less significant individually than they are as a whole (that is, as an urbanistic ensemble, preserving a whole commercial corner essentially as it was originally.) Individually, the two most interesting of the buildings, in my opinion, are: 710 Mission (the n-w corner), with its richly ornamented upper stories; and the simpler building on the n-e corner, with its wide 'Chicago window' proportions, and its unusual iron brackets at the fifth floor level."

The Aronson building was impressively designed to dominate its corner. The building effectively combines traditional design elements more commonly found in the better neighborhoods north of Market Street with the more purely functional qualities of the south of Market Street area. In this manner it dominates the other two structures, and together with them, creates a unique and impressive example of the early century city beautiful commercial block architecture popular in those days. As such, the group constitutes an entity significant to the "south of Market" history.

The National Trust for Historic Preservation, and the San Francisco Landmark Advisory Board have both recommended that this area be preserved as an example of period development. HUD has concluded that the "area" should be limited to these three buildings because their value as a significant entity is derived from the fact that they are on three adjoining corners.

The name "Aronson Historic District" is suggested because of the domimance of the Aronson building in this corner. It was erected as a commercial office building by Abraham Aronson. Mr. Aronson was a Polish immigrant who came to San Francisco in 1870 and became successful in the furniture business. He was an active leader in the Jewish community and helped finance the Stockton Street Synagogue in 1886. After 1894 he was engaged exclusively in the real estate business, buying old buildings and sites and building modern structures in their places. Like other developers, he was especially busy in the period following the earthquake and fire of 1906, and by 1916 had become one of the more prolific commercial builders in the City. Like other important San Franciscans such as Mr. Flood and Mr. Phelan, Mr. Aronson gave permanent recognition to his success by building a large office block in his own name, the first Jewish person to do so in San Francisco. This building, located at the northwest corner of Third and Mission Streets, remained in family ownership until 1938 when it was sold to the Northwestern Mutual Life Insurance Company and became known as the Merchantile Building.

A rather difficult problem is presented by the Aronson Historic District. In the event that the District is found to be eligible for nomination to the National Register, HUD recognizes that all three District buildings are not economically feasible for rehabilitation and retention. Accordingly, HUD would then request the Redevelopment Agency to take photographs and establish a written historical record of the District. In addition, samples of unique structural features of unretainable buildings can be saved by the Redevelopment Agency.

There appears no reasonable approach for the preservation of the Aronson District as a whole. Redevelopment Agency cost studies demonstrate that the Blumenthal and Williams Buildings would require extensive interior and structural changes to the extent that potential buyers could not economically rent in the area. Moreover, the Blumenthal Building was internally destroyed by the 1971 fire and remains mostly vacant and boarded up. The Mercantile Building is in the best physical condition and is scheduled by the Redevelopment Agency for rehabilitation and retention. It will in this way serve as a continuing example of the early commercial architecture of South of Market. The Aronson District, however, as a Historic District, will be retained for future public review by the records established by the Redevelopment Agency.

See Geology and Seismology section (VII-126) for discussion on possible subsidence affecting historical properties.

11. In terms of archeology, the Project area has not had any official exploratory excavations in it. No specific historic or prehistoric archeological sites are known in the Project. In 1910 an Indian shell mound was uncovered just south and outside the Project. During recent excavations for the Bay Area Rapid Transit along Market Street outside of the Project, an ancient Indian skeleton was uncovered.

Unconfirmed newspaper and airline magazine articles indicate that unauthorized amateur scavengers have entered the Project grounds and located some old bottles and gold coins.

An archival study on the YBC Convention Center Block did not yield information indicating specific valuable archeological sites or artifacts worthy of exploratory excavations. Similarly, another study on a site several blocks outside the Project and closer to the old waterfront did not yield artifacts worthy of special professional exploration.

The Project area was fully developed after the 1906 fire. Since then much of the old and blighted structures have been removed. In several areas there remains exposed old basement areas, but primarily as remains from post 1906 construction. It is possible that some of the pre-1906 building foundations and rubble-filled basements may have survived the post 1906 rebuilding and the YBC Project demolition activities.

There is little hope, however, for first locating such remaining rubble-filled, pre-1906 basements and secondly of finding artifacts in those basements which have survived and have significant value. The use of public funds can be considered when there is adequate evidence that excavations would likely yield recoverable items that would contribute to existing knowledge towards the broad patterns of American history; that may be associated with the lives of persons significant in our past; that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a signficant and distinguishable entity whose components may lack individual distinction; or that have yielded or may likely yield information important in prehistory or history.

Due to the public interest in the finding of old bottle, coins and other artifacts from early San Francisco history, HUD has initiated consultations with the California State Historic Preservation Officer and the Secretary of the US Department of Interior to ascertain the eligibility of YBC as a whole Project for potential inclusion on the National Register. This action, moving concurrently with the public comment periods for this EIS, is to formally establish the archeolgical procedures for the Project.

HUD feels from its study of documents regarding archeological findings in YBC and a nearby location that a potential of valuable artifacts to be found in YBC is remote. HUD does not believe its decision on the Project need be delayed for further archival research and or exploratory or test diggings in the Project area.

Although specific sites for artifacts of signficant value are not known in the Project area, the Redevelopment Agency has agreed with HUD to have a professional archeologist available during Project excavation activities to assist in the recovery of artifacts. This approach is to salvage significant artifactual materials and preserve them in local public museums.

The following is the preliminary version of the archeological agreement HUD will seek with the Redevelopment Agency to monitor the Project:

ARCHEOLOGICAL MONITORING PROGRAM

Yerba Buena Center Project

In order to identify, recover, preserve and protect historic and prehistoric artifacts that may be found during the excavation activities of the Yerba Buena Center Project (Calif. R-59), the following procedures are to be carried out by the San Francisco Redevelopment Agency:

1. The Redevelopment Agency shall continue to work with the San Francisco Police Department for careful patrols of those portions of the YBC Project area under excavation to prevent unauthorized entry and exploration for artifactual materials.

2. The Agency in all future contracts for demolition, excavation or construction shall include a clause requiring contractors to turn over to the Agency any artifacts found during the course of their work. The contracts shall also require that this condition be highly publicized to the contractor's employees. In the case of parcels which are to be acquired by a redeveloper, all future disposition agreements are to include a clause giving the Agency permanent rights to all artifacts found on the site.

3. The Agency will retain the services of an archeologist(s) meeting the minimum qualifications of the U.S. Department of Interior. The archeologist(s) shall:

    a. Instruct appropriate Redevelopment Agency Officials, the YBC Project Director, and construction supervisors to be alert for the need for excavation crews to be alert for potential artifactual materials.

    b. Monitor YBC excavation activities.

    c. Be on call for immediate inspection of potential archeological finds to determine and recover such discoveries. The archeologist(s) will be given the authority to stop or divert construction activities in the immediate vicinity of specific finds for a period not to exceed 24 hours. The archeologist must upon any work stoppage immediately notify the Agency and the San Francisco HUD Area Office.

4. Final decisions relating to work stoppages for exploratory or actual excavation for artifactual materials for periods of more than 24 hours are to be concurred in by the San Francisco Area Office of the U.S. Department of Housing and Urban Development.

5. The Redevelopment Agency shall transfer any and all artifacts found in the YBC Project area to the California Academy of Sciences in Golden Gate Park, San Francisco, California, or to such other similar appropriate public museum or agency.

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National Trust for Historic Preservation, letter of February 12, 1974 to Mr. J. P. Jaquet

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MR. Robert Burner, Executive Director, The Foundation for San Francisco's Architectural Heritage

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CLIMATE AND AIR QUALITY

Environmental Setting - Climate

San Francisco can be described as having mild winters (average temperatures between 49 and 55 degrees F.) and pleasant summers (average temperatures between 61 and 63 degrees F.). Table 1, Appendix E, shows the 1973 temperature record. The yearly precipitation normally is about 21 inches; however, during the last two years 1/, rainfall at approximately one-half normal has resulted in drought conditions. On the average, 84 percent of the total annual precipitation occurs from November through March 2/. Table 2, Appendix E, shows the 1974 - 76 rainfall record. During the winter of 1977-1978, more than average rainfall has been received to date; therefore, the water rationing program in San Francisco was discontinued on January 28, 1978.

Topographic variability results in climatic differences within the City, largely depending on geographical relationships to the Pacific Ocean and the Bay. Low hills, the influence of large water bodies and influx of marine air determine the wind patterns of the area.

Fog and low clouds during nights and mornings are characteristic of San Francisco's climate. The Yerba Buena Center area experiences mildly foggy conditions, which occur less frequently than parts of the City near the ocean and the Golden Gate. Notwithstanding the occurrence of fog and low clouds, the sun shines during an average of 66 percent of the daylight hours in San Francisco (the percentage is higher in the YBC area).

Certain generalizations about wind occurrences in the Yerba Buena Center area can be made on the basis of information presented in Appendix E (Tables 3 and 4). The most frequent wind directions are west to northwest 3/ (about 55 percent of the time--identifiable wind directions occur about 75 percent of the time). During certain months, winds from all eight major compass points are experienced in the Redevelopment Area. Those months are January, February, March, November and December. In other months, most of the wind directions are represented, with exceptions. In April and May, little or no NE, E, SE and N winds occur. During the summer months of June, July and August, practically no N, NE, E, SE, or S winds occur in the Area. In September, no E, SE and practically no N winds occur. In October, no E winds occur in the YBC area.

In general, the air is calmer during the nighttime hours and more windy in the late afternoon. The incidence of stagnant or light-variable (no particular wind direction) conditions is always less at 4:00 p.m. than at any other time of the day. Table 4 in Appendix E shows that in June, July and August there were no occurrences of light-variable conditions in four years of record for the 4:00 p.m. period. Overall, calm or light-variable conditions occur about 25 percent of the time.

The elements of climate which affect comfort are temperature, humidity, sunshine, precipitation and wind. Their relative importance varies with the geographical location and the characteristics of local climate.

Existing structures in the Yerba Buena area are generally not over 10 stories high. While the interaction of local wind patterns with high-rise structures is complex, there is no evidence that existing structures in the Project area have created unusually gusty conditions in their vicinities. The dominant factors in existing wind patterns are the open central blocks 4/.

The higher wind speeds of summer may cause discomfort for brief periods of time. Fall in San Francisco generally brings a lessening of winds and higher temperatures. Afternoons in fall could be expected to be comfortable in the YBC area.

Cool temperatures and rains occur during winter months at the site 5/. If there were no rain or storm conditions, the generally low wind speeds of winter 6/ and mild temperatures would raise the comfort in the area.

Spring afternoons in San Francisco on occasion have mild gusts of wind with the result that open or shady portions of the site are cool part of the time.

Visitors find the summer months (July and August) comfortable because the temperatures are lower than those elsewhere in the United States, and wind speeds are mild 7/.

Environmental Setting - Air Quality

Air quality in the San Francisco area is largely determined and influenced by the interplay of topography, air flows (wind speed and direction) and temperature (e.g., sunlight, and temperature inversions) acting on pollutant emissions produced by stationary and mobile sources.

The City's predominantly westerly and northwesterly winds tend to carry pollutants to other parts of the Bay Area, chiefly east and south. Much of the City is generally upwind from major pollution sources of air pollution, such as industrial areas, airports, freeways, and other urban areas. Nevertheless, light-variable (calm) wind situations, which occur about 25 percent of the time on an annual basis, lead to stagnation in the airshed. This is most likely in the fall and winter months. At such times, the potential exists for the entire Bay Area to experience high concentrations of pollutants.

Pollutant levels depend directly on amounts emitted. Atmospheric circulation and wind patterns influence the levels of concentrations of pollutants because they determine the rate of dispersion of contaminants. For example, higher average wind speeds may dilute the emissions of a specific contaminant so that measured air quality levels are much lower than would have occurred with light winds. On the other hand, inversions 8/ increase pollutant concentrations by providing less vertical dilution for emitted contaminants.

Table VII.G.1 is an air pollutant summary for San Francisco based on measurements of pollutant concentrations taken at the Bay Area Air Pollution Control District (BAAPCD) monitoring station at 939 Ellis Street 9/ and projections of monitoring station data to future years. The table shows the major contaminants and the maximum concentrations for applicable averaging times during the period 1974-1988.

Photochemical oxidant has been continuously monitored for 15 years by the BAAPCD. Since the formation of oxidant is highly weather-dependent, the District has instituted a "trend study" technique to remove the primary weather factors (temperature and inversion height) and compare the oxidant levels only for days when conditions favor its formation.

Table 5 in Appendix E shows the trend of average high-hour oxidant concentrations for days with comparable temperature and inversion conditions (April through October, 1962-1976). After peaking in 1965, the oxidant levels have shown a clear downward trend for the past 11 years, despite large annual weather-induced fluctuations. San Francisco has experienced this continuing decline and in recent years (1972-76) has reported the lowest levels for all Bay Area stations; however, Table VII.G.1 indicates that, for 1974 and 1976, the standard was exceeded by 38% and 63%, respectively.

Carbon monoxide (CO) is emitted primarily from vehicular sources (over 90% of CO emissions). These tail-pipe emissions are particularly sensitive to low-level radiation inversions 10/, resulting in daily and seasonal variations. Table VII.G.1 indicates that for the periods shown, one-hour Federal standards for carbon monoxide were not exceeded, while the eight-hour standard of 9 ppm was exceeded by between 10% and 43%.

Air Quality Maintenance Plan (AQMP) Technical Memo #3 prepared by the Environmental Management Task Force (1977) 11/ points out that in the past six years there have been no CO excesses in the Bay Area from March through August. Over 80 percent occur in November, December and January. On a daily basis, over 90 percent of the eight-hour excesses occur between 4 p.m. and 2 a.m., with an intense short maximum from 7 to 9 a.m. followed by low-levels from 10 a.m. to 4 p.m. Since the winter season formation of low-level radiation inversions corresponds to the evening traffic maximum, the sustained build-up of high CO levels occurs then. There is also a day-of-the-week factor, with the greatest frequency of excesses or of levels approaching standards occurring on friday, the maximum vehicle use day.

TABLE VII.G.1. SAN FRANCISCO POLLUTANT CONCENTRATIONS (1974-1988) - WITHOUT YBC PROJECT OR LOCAL IMPACTS

Station: B.A.A.P.C.D.
939 Ellis Street
San Francisco, California

			1974*	1975*	1976*	1980***	1988***
Oxidant	Max. 1-hour conc. (ppm)	Concentrations	.11	.05	.13	****	****
		Federal standard	.08	.08	.08	.08	.08
		% of standard	138%	63%	163%	****	****
Carbon Monoxide (CO)	Max. 1-hour conc. (ppm)	Concentrations	15	31	22	13.9	13.1
		Federal standard	35	35	35	35	35
		% of standard	43%	89%	63%	40%	37%
	Max. 8-hour conc. (ppm)	Concentrations	9.9	12.9	11	8.1	7.8
		Federal standard	9	9	9	9	9
		% of standard	110%	143%	122%	90%	87%
Nitrogen Dioxide (NO_2)	Annual Average (ppm)	Concentrations	.030	.033**	-	.033	.034
		Federal standard	.05	.05	.05	.05	.05
		% of standard	60%	66%		66%	68%
Sulfur Dioxide (SO_2)	Max. 24-hr. conc. (ppm)	Concentrations	.070	.042	.053	0.13	.082
		Federal standard	.14	.14	.14	.14	.14
		% of standard	50%	30%	38%	93%	59%
Total Suspended Particulate (TSP)	Max. 24-hour conc. (mg/m^3)	Concentrations	154	113	136	148	163
		Federal standard	260	260	260	260	260
		% of standard	59%	43%	52%		
	Annual Geometric Mean (ug/m^3)	Concentrations	57	49	51	56	61
		Federal standard	75	75	75	75	75
		% of standard	76%	65%	78%	75%	81%

ppm = parts per million

NOTE: Neither the federal suspended particulate standard of 75 ug/m^3 (annual geometric mean) nor the one-hour carbon monoxide standard of 35 ppm was exceeded during the period shown.

*Source: Bay Area Air Pollution Control District (BAAPCDO Contaminant and Weather Summaries for individual months, 1974, 1975, 1976.
**Source: BAAPCD Tech. Memo No. 3 dated March, 1977, pg. 8.
***Projected values based on ratio of projected emissions to current emissions.
****Photochemical modeling would be required to accurately estimate oxidant concentrations in 1980 and 1988; however, concentrations will be in the same range as those existing in 1974, 1975 and 1976 based on emissions of NO_X and HC.

Carbon monoxide concentrations tend to be more localized then other pollutants such as oxidant. The data in Table VII.G.1 reflect areawide concentrations of carbon monoxide, but the data do not reflect local impact of carbon monoxide on sensitive receptor locations due to street-side concentrations. These local impacts for carbon monoxide are discussed at the end of this Environmental Setting section.

Nitrogen dioxide (NO_2) develops in the atmosphere from nitric oxide(NO), a primary emission from motor vehicles. Nitrogen dioxide is a major factor in the dirty brown discoloration of the air. Table VII.G.1 shows no violation of Federal standards for 1974 and 1975.

Sulfur dioxide (SO_2) is produced primarily by stationary sources, such as refineries and other industries, power plants and other concentrated combustion operations. No major point sources listed in the BAAPCD Emission Inventory Summary for Base Year 1975 are located in or near San Francisco. Table VII.G.1 indicates no violation of the Federal 24-hour standard during the three years shown.

Total suspended particulate (TSP) is produced by natural sources (dust) and technological sources (space heating, aircraft and automobile exhausts, tire wear, etc.). Table VII.G.1 shows that the federal 24-hour standard and federal annual-geometric-mean (AGM) standard were not exceeded during 1974, 1975 and 1976.

Hydrocarbon concentrations have no direct health effects and are, therefore, important only insofar as they contribute to the formation of oxidant which was discussed previously.

HUD air pollutant isopleth maps 12/ provide a more-localized picture of selected pollutant levels in the general vicinity of the YBC area 13/. The annual maximum eight-hour concentrations of carbon monoxide shown on the maps (for year 1973) for the YBC area are approximately 16 mg/m^3 (14.4 ppm), not including local impacts of mobile sources. A portion of the HUD isopleth map (for the south and mid-bay region) which shows the pattern of carbon monoxide areawide concentrations in San Francisco is shown in Figure VII.G.1. The values on the HUD isopleth map for CO exceed the eight-hour Federal standard of 9 ppm, which was exceeded on three days in 1973.

On the maps, the annual geometric mean concentrations for suspended particulate range from 50 to 60 ug/m^3 (See Figure VII.G.2). These values are below the federal standard of 75 mg/m^3.

Annual average emissions in San Francisco during 1975 are shown in Table 6, Appendix E (from BAAPCD Emissions Inventory, Summary Report, 1976). In San Francisco, the major mobile sources are automobiles and light-duty trucks. Major stationary source emissions are attributable to the combustion of fuels primarily associated with heating/cooling and power generation, with some contribution from light-industrial uses.

FIGURE VII.G.1. AIR POLLUTANT ISOPLETH MAP
Carbon Monoxide Annual Maximum 8-Hr. Concentration (mg/m^3)

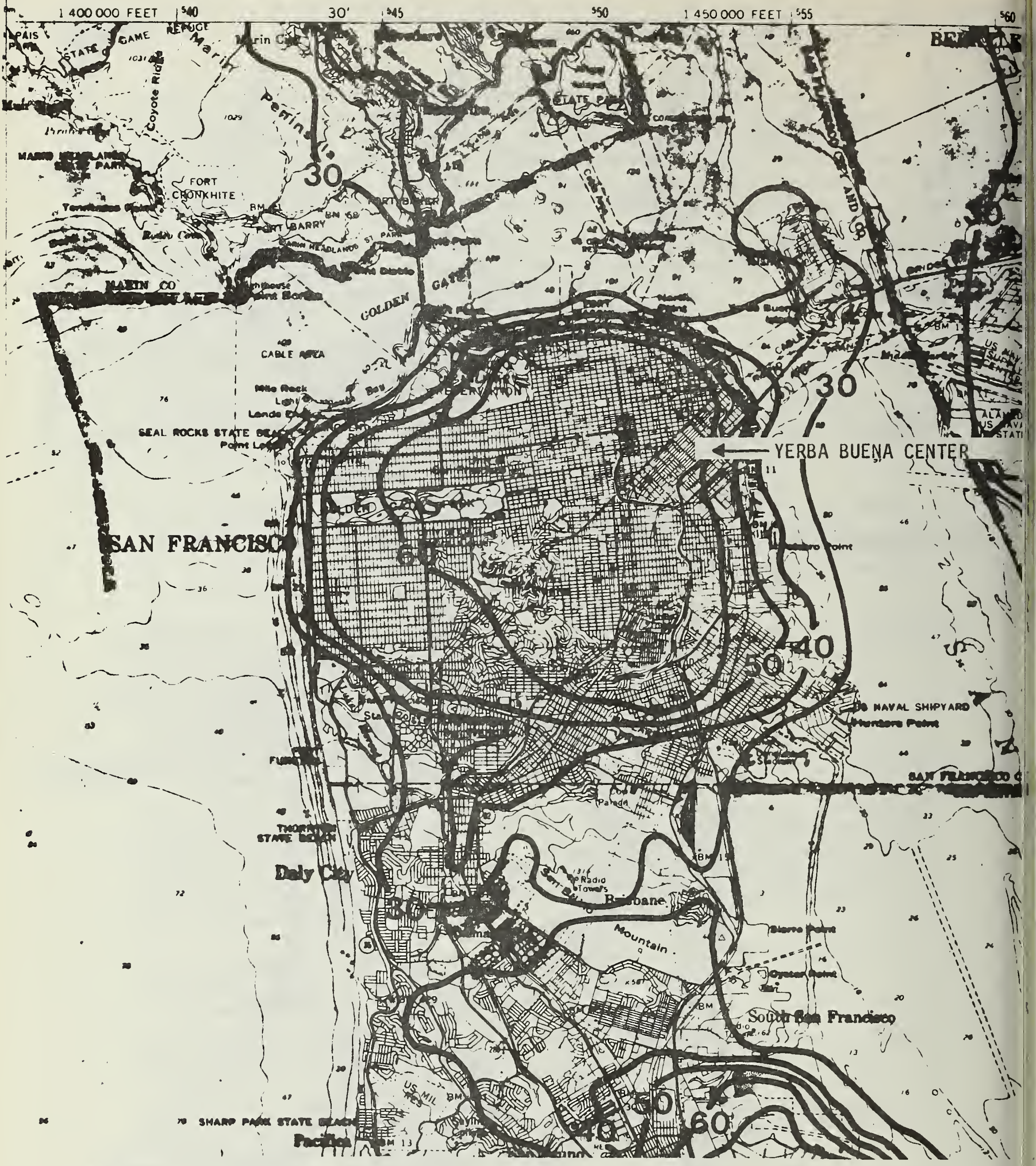
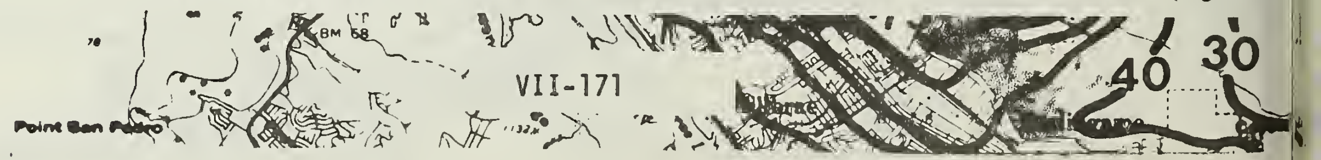


FIGURE VII.G.2. AIR POLLUTANT ISOPLETH MAP
Total Suspended Particulate Annual Geometric Mean Concentrations ($\mu g/m^3$)



Currently, emissions in YBC and vicinity are predominantly the result of motor vehicle traffic in the area. For example, approximately 177,000 vehicles per day pass by the Yerba Buena Center site on the James Lick Freeway, in addition to the heavy vehicular traffic on city streets within YBC. No major stationary sources are located in or upwind of the area 14/.

Localized impacts of carbon monoxide on sensitive receptors which is attributable to mobile sourse emissions were calculated using the approach recommended by the Bay Area Air Pollution Control Division (BAAPCD) 15/. It takes into account both: (a) emissions from vehicles traveling at speed on the streets and (b) those from vehicles idling on streets and in parking areas. All major pollutants have been evaluated with the BAAPCD methodology. These pollutants are carbon monoxide, non-methane hydrocarbons, sulfur dioxide, nitrogen dioxide and suspended particulates. Mobile source contributions to area-wide (Yerba Buena Center area) and regional air quality have been calculated for existing conditions in 1977 (Base Year 1977), Base Year 1980 16/ (without further Yerba Buena Center development) and Base Year 1988 (without further Yerba Buena Center development).

The Project impacts in both 1980 and 1988 have also been calculated and are discussed under "Impacts" 17/. The BAAPCD methodology emphasizes the "relative contributions of project emissions to the degradation of air quality". The term "project emissions" refers to the extra mobile source emissions produced in the surrounding one-kilometer square area (Figure VII.G.1) 18/ by the Project. The analyzed streets within the one-kilometer square area are listed in Table 1, Appendix F.

The emission factor tables in the BAAPCD calculation approach are based on data contained in Supplement No. 5 to the U.S. Environmental Protection Agency (EPA) publication AP-42, "Compilation of Air Pollution Emission Factors" 19/. Revised Supplement No. 5 to EPA publication AP-42, which was in draft form at the time of this writing, will make substantial revisions to the emission factors in Supplement 5 indicating a general increase in the estimated level of mobile emissions. Mobile source impact calculations for this assessment are based on revised Supplement No. 5 to AP-42 as noted in parenthesis in tables.

Table VII.G.2 summarizes existing and projected carbon monoxide concentrations at sensitive receptor locations (the lot line of housing sites adjacent to the street) in 1977, 1980 and 1988 without the YBC Project. Total concentrations shown in the table are somewhat conservative because a small portion of the "mobile local impact" may be included in the "mobile areawide" concentrations. The following conclusions can be drawn from the data in Table VII.G.2:

TABLE VII.G.2. SUMMARY OF PROJECTED CARBON MONOXIDE CONCENTRATIONS AT SENSITIVE RECEPTOR LOCATIONS WITHOUT THE YBC PROJECT (PARTS PER MILLION)

1980

ITEM	4th & Harrison		3rd & Folsom		4th & Folsom		4th & Howard		3rd & Howard		3rd & Mission		4th & Mission	
Background Concentrations	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
*Stationary Source	1.5	0.7	1.5	0.7	1.5	0.7	1.5	0.7	1.5	0.7	1.5	0.7	1.5	0.7
Mobile Areawide**	6.6	3.7	6.6	3.7	6.6	3.7	6.6	3.7	6.6	3.7	6.6	3.7	6.6	3.7
	(11.4)	(6.36)	(11.4)	(6.36)	(11.4)	(6.36)	(11.4)	(6.36)	(11.4)	(6.36)	(11.4)	(6.36)	(11.4)	(6.36)
Mobile Local Impact**	10.6	1.59	11.0	1.72	9.7	1.39	8.7	1.25	10.0	1.59	9.4	1.51	8.2	1.18
	(18.23)	(2.73)	(18.92)	(2.96)	(16.68)	(2.39)	(14.96)	(2.15)	(17.2)	(2.73)	(16.17)	(2.60)	(14.10)	(2.03)
Total***	19.17	6.99	20.1	7.12	18.8	6.79	17.8	6.65	19.1	6.99	18.5	6.91	17.3	6.58
	(33.16)	(11.3)	(32.82)	(11.02)	(30.58)	(10.45)	(28.86)	(10.21)	(31.1)	(10.79)	(30.07)	(10.66)	(28.0)	(10.09)
% of Standard**	56%	78%	57.4%	79%	54%	75%	51%	74%	55%	78%	53%	77%	49%	73%
	(95%)	(126%)	(94.4%)	(122%)	(87%)	(116%)	(83%)	(113%)	(89%)	(120%)	(86%)	(118%)	(80%)	(112%)

1988

ITEM	4th & Harrison		3rd & Folsom		4th & Folsom		4th & Howard		3rd & Howard		3rd & Mission		4th & Mission	
Background Concentrations	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
*Stationary Source	1.1	0.5	1.1	0.5	1.1	0.5	1.1	0.5	1.1	0.5	1.1	0.5	1.1	0.5
Mobile Areawide**	4.9	2.8	4.9	2.8	4.9	2.8	4.9	2.8	4.9	2.8	4.9	2.8	4.9	2.8
	(11.03)	(6.30)	(11.03)	(6.30)	(11.03)	(6.3)	(11.03)	(6.3)	(11.03)	(6.3)	(11.03)	(6.3)	(11.03)	(6.3)
Mobile Local Impact**	7.6	1.67	7.6	1.95	6.7	1.46	6.0	1.29	6.9	1.78	6.6	1.70	5.7	1.21
	(17.1)	(3.76)	(17.1)	(4.39)	(15.08)	(3.29)	(13.5)	(2.90)	(15.5)	(4.0)	(14.9)	(3.83)	(12.83)	(2.72)
	14.6	5.97	14.6	6.25	13.7	5.76	13.0	5.59	13.9	6.08	13.6	6.0	12.7	5.51
Total***	(30.23)	(11.56)	(30.23)	(12.19)	(28.21)	(11.09)	(26.63)	(10.7)	(28.9)	(11.8)	(28.03)	(11.63)	(25.96)	(10.52)
% of	42%	66%	42%	69%	39%	64%	32%	62%	40%	68%	39%	67%	36%	61%
Standards***	(86%)	(128%)	(86%)	(135%)	(81%)	(123%)	(76%)	(119%)	(83%)	(131%)	(80%)	(129%)	(74%)	(117%)

* Estimated to be 10% of 1976 monitored concentrations in Table VII.G.1.

** Values not in parenthesis were calculated using the emission factors in the BAAPCD "Guidelines for Air Quality Impact Analysis", 1975. Values in parenthesis are based on emission factors in EPA publication AP-42, revised Supplement No. 5 and correspond to the values calculated using the BAAPCD "Guidelines" (values not in parenthesis) multiplied by the following factors: for 1977, 1.42; for 1980, 1.72; for 1988, 2.25.

*** Values in parenthesis correspond to stationary component, plus mobile components calculated using AP-42 revised Supplement No. 5.

- Carbon monoxide concentrations (without Project impacts) calculated using AP-42 Supplement No. 5 emission factors presently in effect will;

  - In 1980, range between 49% and 58% of the carbon monoxide 1-hour standard, and range between 73% and 79% of the 8-hour standard, depending upon location.
  - In 1988, range between 32% and 42% of the carbon monoxide 1-hour standard, and range between 61% and 69% of the 8-hour standard, depending upon location.

- Using AP-42 revised Supplement No. 5 (currently in draft form), concentrations will;

  - In 1980, range between 80% and 95% of the carbon monoxide 1-hour standard, and range between 112% and 126% of the 8-hour standard, depending upon location;
  - In 1988, range between 74% and 86% of the carbon monoxide 1-hour standard, and range between 117% and 135% of the 8-hour standard, depending upon location.

Air Quality Management

On June 13, 1974, the California Air Resources Board (ARB) designated the nine counties of the San Francisco Bay Area Air Basin as an Air Quality Maintenance Area for particulate matter, oxidants and sulphur dioxide. An air quality maintenance area (AQMA) is an area which either a) currently exceeds one or more national air quality standards and is not expected to achieve the national standard by 1980 or b) currently meets all national air quality standards but is expected to exceed one or more standards by 1985.

Since the Bay Area was designated as an AQMA, the Environmental Management Task Force (EMTF) has begun development of an Air Quality Maintenance Plan (AQMP). The goals of the plan are the attainment and maintenance of State and Federal air quality standards as effectively as possible through the development of a series of alternative control strategies. For strategy developed will consist of direct emission controls and indirect land use and transportation-related measures. The differences among the strategies will be the degree of emphasis placed on each area of possible control.

The above designation of the Bay Area as an AQMA was based on air quality existing in 1974 and projections of anticipated air quality. However, the Clean Air Act Amendments of 1977 (Public Law 95-95 (HR 6161); August, 1977) also defines "nonattainment areas", which is a designation based on historical data. The act defines a nonattainment area as:

"An area which is shown by monitored data or which is calculated by air quality modeling (or other methods determined by the Administrator to be reliable) to exceed any national ambient air quality standard for such pollutant."

On December 2, 1977, the California Air Resources Board designated the nine counties of the Bay Area a nonattainment area as defined above, for carbon monoxide, oxidant and total suspended particulate 20/. Section 129(a)(2)(C) of the Clean Air Act Amendments requires that, for nonattainment areas, the State must develop a program prior to January 1, 1979 to provide for a specified amount of emission reduction. Section 176 (c) of the Amendments requires that Federal assistance in nonattainment areas be in accordance with such a program. However, YBC is a fully-funded urban renewal project with an approved urban renewal plan. For this reason, and because a State program for attainment does not currently exist, the sanctions against nonconforming projects which are described in Section 176 (c) of the Amendments do not apply to YBC.

The HUD air pollutant isopleth maps identify several areas in the Bay Area where the eight-hour carbon monoxide standard was not attained in 1973. One of these nonattainment areas was centered in downtown San Francisco, which includes Yerba Buena Center. As shown in Table VII.G.1, monitoring data at 939 Ellis Street, San Francisco, indicates that the carbon monoxide standard was also not attained in San Francisco in 1974, 1975 and 1976; the oxidant 1-hour standard was not attained in 1974 and 1976.

Impacts - Climate

Changes in local climatic patterns would occur in the vicinity of the Yerba Buena Center area under the development plans.

Changes in local surface wind patterns would result from the effects of buildings on wind flow. The interactions of local wind patterns with high-rise structures are complex; without actual building layouts and designs, estimated effects can only be speculative. Building height, shape, bulk, width, orientation, surface treatment, and location with respect to other structures all affect winds. Generally, taller buildings result in higher wind speeds and more turbulent wind flows than lower ones. Buildings located in close proximity to one another can channel the wind flow (much as when a wind flows through a valley) and can result in gusty winds of variable directions, especially at building corners.

A study of the 1972 Yerba Buena convention center plan (J.E. Cermak, et al, June 1972) concluded that winds from the south would generally have the highest speeds 21/; northwest winds (most of the year) would generally have the lowest speeds. However, turbulence levels near buildings would generally be more of a problem with northwest winds than those with either south or west winds, since northwest winds are the most frequent at all seasons at the site (Table 3, Appendix E). Construction of the Convention Center underground, as apposed to above ground, would tend to reduce wind velocities adjacent to the Convention Center.

Gusty winds, especially around building corners, would be likely to be more frequent during the windy spring and summer months than they are at present. Also, because the wind patterns at the Yerba Buena site would vary with direction, the frequency of each wind direction is important. Northwesterly and westerly winds are the most frequent winds at all seasons at the site.

Turbulence and wind speed are of concern because of their effects on: (a) ability of pedestrians, especially the elderly and the handicapped, to walk in the area; (b) exposure to blowing litter and dust; (c) pedestrian discomfort due to wind chill; and (d) local dispersion of pollutants.

Seasonal pedestrian comfort with respect to precipitation would generally be similar to that under the existing conditions.

Shadow patterns in YBC would depend on the final locations, designs and heights of buildings. Shadow effects would also change with the daily and seasonal intensity and frequency of sunshine, and with the varying sun angles. Generally, areas experiencing frequent winds and shadows would have higher pedestrian discomfort than those areas which afford the pedestrian shelter from the wind and more sunlight. As YBC development occurs, urban design review by the San Francisco Redevelopment Agency is expected to consider shadowing effects, particularly for proposed high rises. Of special importance would be the potential shadowing of the park area in block CB-3, and of the pedestrian concourse. Also of concern would be off-site parking (out of YBC) shadows cast by proposed high rises on the periphery, and on-site shadows cast on any potential plazas, or landscaped areas of individual parcels.

Impacts-Air Quality

Construction activities--chiefly excavation--would affect air quality in the vicinity of the Yerba Buena site by creating suspended particulate (dust). Construction activities would be expected to occur over a ten year period, but might take longer. In CB-3, excavation for the convention center would start in 1978. Assuming that depth of excavation will be essentially equal for all buildings, excavation would be proportional to land coverage by proposed buildings 22/.

The quantity of dust emissions which would result from construction operations is proportional to the area of land being worked and the type and level of construction activity. Most emissions from construction would be produced by earth moving (site preparation); amount of emissions would vary substantially in intensity as different phases and operations of construction are begun and completed.

Construction of the convention center is expected to take 30 months. This includes excavation of the site (approximately 11 acres), which is expected to take five months 23/.

Approximately 600,000 cubic yards of earth would be moved in excavation for the convention center. Construction activities are expected to be ongoing from 8:00 a.m. through 4:30 p.m. Monday through Friday 18/.

Approximate emission factors for earth moving have been developed by the Environmental Protection Agency 24/. Suspended particulate emission factors range from 1.2 to 1.4 tons per acre per month of active construction.

Particulate emissions associated with excavation of the convention center are expected to range from 13 tons per month to 15 tons per month. For an average work month of 22 days, 0.6 to 0.7 tons per day would result from excavation of the convention center site. This would mean that local particulate concentrations averaged over a 24-hour period would range from 7,300 ug/m^3 to 8,500 ug/m^3. These levels would exceed federal and state standards for suspended particulate. Concentrations for the 8-hour period of work would be expected to be higher than the 24-hour concentrations (22,000 ug/m^3 to 26,000 ug/m^3).

Trucks hauling excavated material from the site could raise particulate levels on haul route roadways and surrounding areas, because of spillage and wind-blown dirt.

Since information concerning excavation associated with construction at full development is not available, no estimates of particulate levels for this period can be made. On a per-block basis, excavation emissions would generally be less than those for the convention center, as noted earlier.

Project air quality impacts after development include the effects of vehicular emissions: (a) on regional air quality, particularly oxidant formation; and (b) on local pollutant concentrations, primarily of carbon monoxide. In addition to mobile source emmissions, fuel combustion emissions associated with building heating and cooling would affect local air quality.

Discussion of air quality impacts is presented in the following manner:

- Consideration of Project impacts on sensitive receptors within the 1-kilometer square area surrounding YBC including;
    - Mobile source impacts
    - Stationary source impacts
- Consideration of Project impacts on oxidant (photochemical smog) formation and regional transport.

Mobile source impacts on area-wide concentrations due to the YBC project are shown in Table VII.G.3. The Project provides for the completion of

Table VII.G.3. YBC PROJECT-RELATED MOBILE SOURCE IMPACTS (AREA-WIDE), 1980 AND 1988

		1980	1988
Carbon Monoxide (CO)	Max. 1-hour conc.	2.79 ppm (*4.8)	4.1 ppm (*9.1)
	Max. 8-hour conc.	1.7 ppm (*2.9)	2.3 ppp (*5.3)
Nitrogen Dioxide (NO_2)	Annual Average	.02 ppm	.02 ppm
Sulfur Dioxide (SO_2)	Max. 24-hour conc.	.01 ppm	.02 ppm
Total Suspended Particulate (TSP)	Max. 24-hour conc.	15 mg/m^3	22 mg/m^3
	Annual Geometric Mean	5 mg/m^3	8 mg/m^3

*Values in parenthesis are based on emission factors in EPA Publication AP-42, Supplement No. 8 which is undergoing draft circulation.

the convention center by 1980. Therefore, Project impacts on air quality in 1980 are due primarily to traffic increases attributable to the convention center. Project impacts in 1988 are also due primarily to mobile sources, and reflect increases in traffic to and from YBC at full development. The BAAPCD "guideline approach" was used to calculate these impacts.

Local impacts of Project-related traffic on carbon monoxide concentrations at sensitive receptor locations were also calculated using the BAAPCD guidelines. These local impacts are in addition to project-related impacts on area-wide concentrations of carbon monoxide, and are shown in Table VII.G.4.

Table VII.G.4. LOCAL IMPACT OF CARBON MONOXIDE (FROM STREETS) AT SENSITIVE RECEPTORS*

Sensitive Receptor Location*	Local Impact on Concentrations at Sensitive Receptor**							
	1980				1988			
	1-Hr.		8-Hr.		1-Hr		8-Hr.	
4th & Harrison St.	0.58	(1.0)	0.17	(0.3)	0.89	(2.0)	0.27	(0.6)
3rd & Folsom St.	0.58	(1.0)	0.17	(0.3)	0.89	(2.0)	0.22	(0.5)
4th & Folsom St.	0.58	(1.0)	0.12	(0.2)	0.89	(2.0)	0.13	(0.3)
4th & Howard St.	0.58	(1.0)	0.17	(0.3)	0.89	(2.0)	0.22	(0.5)
3rd & Howard St	0.58	(1.0)	0.23	(0.4)	0.89	(2.0)	0.18	(0.4)
3rd & Mission St.	0.58	(1.0)	0.17	(0.3)	0.44	(1.0)	0.22	(0.5)
4th & Mission St.	0.58	(1.0)	0.12	(0.2)	0.44	(1.0)	0.13	(0.3)

*Sensitive receptor location is the lot line nearest the street (source of carbon monoxide).

**Values not in parenthesis are based on emission rates in EPA Publication AP-42, Supplement No. 5; values in parenthesis are based on emission rates in EPA publication AP-42, revised Supplement No. 5.

The above entries are worst-case estimates, in the sense that the BAAPCD guideline approach is based on:

- Angle of 22.5 degrees between wind and road
- Flat-plane geometry (actual ground levels would be slightly lower because the freeway is elevated).

Further, for each street corner, that wind direction is assumed that would maximize the contribution from James Lick Freeway, and add a contribution from the pertinent north/south street. For all entries in the table, the dominant contributor is the freeway, rather than the adjacent street. This can be seen from the reduction in CO levels

in any year as one proceeds from the freeway north. Mission Street and Howard Street traffic are heavier than that on Harrison Street and Folsom Street. Winds at angles of 22.5 degrees with respect to the freeway, and driving pollutants into YBC, would have to come from the southwest or the northeast; these are infrequent directions 25/.

Stationary source impacts on area-wide air quality due to YBC in 1980 and 1988 are due primarily to emissions generated by space heating and cooling associated with the Project. The analysis of stationary source emissions attributable to space heating and cooling follows the techniques suggested by the Environmental Protection Agency 26/. The EPA technique estimates the fuel combustion emissions based on the developed square footage, fuel use type (gas or oil) and fuel combustion emission factors 27/. The estimation of fuel combustion emissions is based on fuel use estimates developed in Section VII.1 (Resource Use Impacts).

The energy consumption estimates and resultant emission estimates were developed for generalized use categories. A summary of total fuel combustion emissions (emissions of use types listed in Table 2, Appendix F, summed for the Project in 1980 and 1988) is presented in Table VII.G.5. These emissions are compared in Table VII.G.5. to the total emission estimates for the same use categories for San Francisco as a whole in 1980 and 1988.

Table VII.G.6 shows the impact (incrimental increase) of the above Project stationary source emissions on area-wide concentrations.

Air Quality After Project Completion - 1980 and 1988

The non-construction related concentrations of each pollutant that will result after completion of the convention center in 1980, and at full YBC development in 1988, will be the total of projected concentrations without a project (see "Environmental Setting - Air Quality") and Project impacts from project-related mobile and stationary sources. These concentrations for nitrogen dioxide, sulfur dioxide, total suspended particulate and oxidant are shown in Table VII.G.7, together with a comparison of these concentrations to the federal air quality standard (see "% of standard" in Table VII.G.7.) This table shows exceedance of federal air quality standards for three of the four pollutants in 1980, and all four of the four pollutants in 1988.

TABLE VII.G.5 SUMMARY OF STATIONARY SOURCE FUEL COMBUSTION EMISSIONS (TONS/DAY) FOR YERBA BUENA REDEVELOPMENT AREA (ANNUAL AVERAGES)

ITEM	PARTIC.	SO_X	CO	HC	NO_X
Project - 1980	0.004	0.0162	0.004	0.002	0.024
+San Francisco - 1980 Base Year*	1.3	1.9	0.6	0.15	7.5
Project Emissions as a Percentage of San Francisco - 1980 Base Year	.30%	.8%	.66%	1.3%	.32%
Project - 1988	0.032	0.29	0.012	0.007	0.093
+ San Francisco - 1988 Base Year*	1.5	1.2	0.7	0.15	8.0
Project Emissions as a Percentage of San Francisco - 1988 Base Year	2.1%	24%	1.7%	4.6%	1.1%

+Note that emissions for San Francisco are for fuel combustion (heating and cooling) and not total emissions from all uses or sources.
*Source: B.A.A.P.C.D., Base Year Emissions for 1980 and 1988, Modeled results obtained from Nat Flin, Air Pollution Engineer, August 15, 1977.
Note: The base year emissions presented here are San Francisco totals. These values were prorated from District-wide emission totals, assuming a constant ratio of San Francisco to District in future years--confirmed by Nat Flin, B.A.A.P.C.D.

Table VII.G.6 YBC PROJECT-RELATED STATIONARY SOURCE IMPACTS ON CONCENTRATIONS, 1980 AND 1988

		1980	1988
Carbon Monoxide (CO)	Max. 1-hour conc.	Negligible	Negligible
	Max. 8-hour conc.	Negligible	0.2 ppm
Nitrogen Dioxide (NO_2)	Annual Average	.008 ppm	.038 ppm
Sulfur Dioxide (SO_2)	Max. 24-hour conc.	.03 ppm	.22 ppm
Total Suspended Particulate (TSP	Max. 24-hour conc.	10.2 ug/m^3	33.6 ug/m^3
	Annual Geometric Mean	3.7 ug/m^3	11.7 ug/m^3

Table VII.G.7 AIR QUALITY AFTER PROJECT COMPLETION (EXCEPT CARBON MONOXIDE AND HYDROCARBONS)

			1980	1988
Nitrogen Dioxide	Annual Average	Concentrations w/o Project	.033*	.34*
		Project-Related Mobile Sources	.02	.02
		Project-Related Stationary Sources	.008	.038
		NO_2 Concentrations After Project Completion	.061	.092
		Federal Standard	.05 ppm	.05 ppm
		% of Standard	122%	184%
Sulfur Dioxide	Max. 24-Hr. conc.	Concentrations w/o Project	.13 ppm	.082 ppm
		Project-Related Mobile Sources	.01 ppm	.02 ppm
		Project-Related Stationary Sources	.03 ppm	.22 ppm
		SO_2 Concentrations After Project Completion	0.17 ppm	0.322 ppm
		Federal Standard	.14 ppm	.14 ppm
		% of Standard	121%	230%
Total Suspended Particulate	Max. 24-Hr. Conc.	Concentrations w/o Project	148 ug/m^3	163 ug/m^3
		Project-Related Mobile Sources	15 ug/m^3	22 ug/m^3
		Project-Related Stationary Sources	10.2 ug/m^3	33.6 mg/m^3
		TSP Concentrations After Project Completion	173.2 ug/m^3	218.6 ug/m^3
		Federal Standard	260 ug/m^3	260 ug/m^3
		% of Standard	66.6%	84%
	Annual Geometric Mean (AGM)	Concentration w/o Project	56 ug/m^3	61 ug/m^3
		Project-Related Mobile Sources	5 ug/m^3	8 ug/m^3
		Project-Related Stationary Sources	3.7 ug/m^3	11.7 ug/m^3

Table VII.G.7 (cont'd)

			1980	1988
		TSP Concentrations After Project Completion	64.7 ug/m^3	80.7 ug/m^3
		Federal Standard	75 ug/m^3	75 ug/m^3
		% of Standard	86%	108%
Oxidant	Max. 1-Hr. Conc.	Concentrations w/o Project	.05 to .13*	.05 to 13*
		Project-Related Mobile Sources	Negligible at YBC**	Negligible at YBC**
		Project-Related Stationary Sources	Negligible at YBC**	Negligible at YBC**
		Oxidant Concentrations After Project Completion	.05 to .13	.05 to .13
		Federal Standard	.08	.08
		% of Standard	63% to 163%*	63% to 163%*

* Photochemical modeling would be required to accurately estimate oxidant concentrations in 1980 and 1988; however, concentrations will be in the same range as those existing in 1974, 1975 and 1976 based on emissions of NO_X and HC.

** Primary impacts are downward in the Livermore Valley or Santa Clara Valley; however, as indicated under the Photochemical oxidant formation analysis, even that impact will be minimal.

Carbon monoxide concentrations after project completion in 1980 and at full project development in 1988 are shown for sensitive receptor locations in Table VII.G.8. This table includes the local line-source (street) impacts of carbon monoxide due to project-related traffic, in addition to area-wide impacts throughout the 1 km x 1 km square area centered on YBC. The following conclusions can be drawn from the data in Table VII.G.8:

- Carbon monoxide concentrations after project completion (not including consttuction impacts) calculated using AP-42 Supplement No. 5 emission factors presently in effect will;
  - In 1980, range between 59% and 67% of the carbon monoxide 1-hour standard, and range between 94% and 100% of the 8-hour standard, depending upon location.
  - In 1988, range between 49% and 60% of the carbon monoxide 1-hour standard, and range between 90% and 97% of the 8-hour standard, depending upon location.
- Using AP-42 revised Supplement No. 5 (currently in draft form), concentrations will;
  - In 1980, range between 97% and 114% of the carbon monoxide 1-hour standard, and range between 147% and 161% of the 8-hour standard, depending upon location.
  - In 1988, range between 103% and 118% of the carbon monoxide 1-hour standard, and range between 179% and 200% of the 8-hour standard, depending upon location.

Oxidant (ozone) is formed primarily by atmospheric reactions involving sunlight, hydrocarbons (HC) and nitrogen oxides (NO_x) 28/. Motor vehicle exhaust (which produces approximately three-fifths of all NO_x and one half of all HC) is the largest source of emissions in the YBC area. The chemical reactions which produce oxidant (ozone) usually occur several hours after the HC and NO_x are emitted. By that time the pollutants have been carried miles by the wind and mixed by atmosphere with pollutants from other sources. The highest oxidant (smog) levels in the Bay Area occur in the areas around Livermore and San Jose. San Francisco emissions contribute in both these areas.

Emissions from the YBC area were estimated for existing conditions under "Environmental Setting - Air Quality." In addition, Project emissions which contribute to oxidant formation were estimated as a base for the sensitivity analysis (Table VI.G.9). Emissions for the remainder of the region (Bay Area) are described only for current conditions and corrected for continuing implementation of emission controls. Forecasts of future

TABLE VII.G.8. AIR QUALITY AFTER PROJECT COMPLETION - CARBON MONOXIDE ONLY

-1980-

ITEM	4th & Harrison		3rd & Folsom		4th & Folsom		4th & Howard		3rd & Howard		3rd & Mission		4th & Mission	
	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.
Concentrations w/o Project*	19.17 (33.16)	6.99 (11.3)	20.1 (32.82)	7.12 (11.02)	18.8 (30.58)	6.79 (10.45)	17.8 (28.86)	6.65 (10.21)	19.1 (31.1)	6.99 (10.79)	18.5 (30.07)	6.91 (10.66)	17.3 (28)	6.68 (10.09)
Project Mobile Areawide*	2.79 (4.8)	1.7 (2.9)	2.79 (4.8)	1.7 (2.9)	2.79 (4.8)	1.7 (2.9)	2.79 (4.8)	1.7 (2.9)	2.79 (4.8)	1.7 (2.9)	2.79 (4.8)	1.7 (2.9)	2.79 (4.8)	1.7 (2.9)
Project Mobile Local Impact*	0.58 (1.0)	0.17 (0.3)	0.58 (1.0)	0.17 (0.3)	0.58 (1.0)	0.12 (0.2)	0.58 (1.0)	0.17 (0.3)	0.58 (1.0)	0.23 (0.4)	0.58 (1.0)	0.17 (0.3)	0.58 (1.0)	0.12 (0.2)
CO Concentrations After* Project Completion	22.5 (40)	8.9 (14.5)	23.5 (38.6)	9.0 (14.2)	22.2 (36.4)	8.61 (13.55)	21.2 (34.66)	8.52 (13.41)	22.47 (36.9)	8.9 (14.1)	21.9 (35.87)	8.8 (13.86)	20.7 (33.8)	8.5 (13.2)
Federal Standard	35	9	35	9	35	9	35	9	35	9	35	9	35	9
% of Standard*	64% (114%)	99% (161%)	67% (110%)	100% (158%)	63% (104%)	96% (150%)	61% (99%)	95% (149%)	64% (105%)	99% (157%)	63% (102%)	98% (154%)	59% (97%)	94% (147%)

-1988-

ITEM	4th & Harrison		3rd & Folsom		4th & Folsom		4th & Howard		3rd & Howard		3rd & Mission		4th & Mission	
	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.	1-Hr.	8-Hr.
Concentrations w/o Project*	14.6 (30.23)	5.97 (11.56)	14.6 (30.23)	6.25 (12.19)	13.7 (28.21)	5.76 (11.09)	13.0 (26.63)	5.59 (10.7)	13.9 (28.9)	6.08 (11.8)	13.6 (28.03)	6.0 (11.63)	12.7 (25.96)	5.51 (10.52)
Project Mobile Areawide*	4.1 (9.1)	2.3 (5.3)	4.1 (9.1)	2.3 (5.3)	4.1 (9.1)	2.3 (5.3)	4.1 (9.1)	2.3 (5.3)	4.1 (9.1)	2.3 (5.3)	4.1 (9.1)	2.3 (5.3)	4.1 (9.1)	2.3 (5.3)
Project Mobile Local Impact*	0.89 (2.0)	0.27 (0.6)	0.89 (2.0)	0.22 (0.5)	0.89 (2.0)	0.13 (0.3)	0.89 (2.0)	0.22 (0.5)	0.89 (2.0)	0.18 (0.4)	0.44 (1.0)	0.22 (0.3)	0.44 (1.0)	0.13 (0.3)
CO Concentrations After* Completion	19.6 (41.33)	8.54 (17.46)	19.59 (41.33)	8.77 (17.99)	18.7 (39.31)	8.19 (16.69)	17.99 (37.73)	8.11 (16.5)	18.89 (40)	8.56 (17.5)	18.14 (38.13)	8.52 (17.43)	17.22 (36.06)	8.11 (16.12)
Federal Standard	35	9	35	9	35	9	35	9	35	9	35	9	35	9
% of Standard*	56% (118%)	95% (194%)	60% (118%)	97% (200%)	53% (112%)	91% (185%)	51% (108%)	90% (183%)	54% (114%)	95% (194%)	52% (109%)	95% (194%)	49% (103%)	90% (179%)

*Values not in parenthesis were calculated using the emission factors in the BAAPCD "Guidelines for Air Quality Impact Analysis", 1975. Values in parenthesis are based on emission factors in EPA publication AP-42, revised Supplement No. 5 and correspond to the values calculated using the BAAPCD "Guidelines" (values not in parenthesis) multiplied by the following factors: for 1977, 1.42; for 1980, 1.72; for 1988, 2.25.

TABLE VI.G.9. AUTOMOTIVE EMISSIONS (in grams sec^{-1} km^{-2}) CORRESPONDING TO MORNING (6-9 a.m.) TRAFFIC PEAK IN A ONE-SQUARE-KM REGION SURROUNDING THE YERBA BUENA CENTER

	Without Project (Base Year)		Project Impact	
Pollutant	1980	1988	1980	1988
NO*	6.7	4.2	6.92	4.55
NO_2**	0.54	0.34	0.56	0.37
Olefins	0.74	0.30	0.76	0.34
Paraffins	14.2	5.84	14.7	6.49
Aldehydes	1.33	0.53	1.38	0.60
Aromatics	5.9	2.35	6.1	2.6
Unreactive Hydrocarbons	2.0	0.78	2.1	0.88
Carbon Monoxide	171.0	63.8	177.0	79.5

*Nitric Oxide
**Nitrogen dioxide

emissions, which depend on urban development transit options in other Bay Area locations and on emission control measures, are expected to play a part in the analysis of the sensitivity of regional oxidant formations to the changes of emissions at YBC 29/.

A report by Systems Applications, Incorporated (SAI), San Rafael, California concludes that the Project would not produce a detectable change in oxidant concentrations in the other parts of the Bay Area where San Francisco emissions contribute to smog. This is demonstrated by several independent techniques:

- By application of the results of a regional study in the Denver, Colorado area. The details appear in Appendix F.

- By photochemical modeling for YBC.

YBC occupies approximately one-half of the 1-km square analysis area. Peak Bay Area ozone concentrations typically occur in mid to late afternoon, six to eight hours after the peak emissions during the morning rush hour. Peak ozone concentrations on days with westerly winds occur to the east of the Oakland hills in the Livermore Valley, which is 60 to 70 km downwind. On days with northerly winds blowing down in the bay shoreline, ozone concentrations occur at comparable distances in the direction of San Jose or beyond. A typical spreading angle for a pollutant plume 30/, given San Francisco wind speeds and sunny conditions, would be on the order of 15 degrees (Cramer, Geary and Bowers, 1975). At a distance of 60 km, the plume width would be about 15 km. Thus, emissions within a 15 km circle around YBC would be partially or full mixed with the YBC emissions by the time and at the place of the peak ozone concentrations. Assuming that the emissions in the 15 km circle are roughly homogeneous, the ratio of YBC emissions to total mixed emissions at the peak-concentration location would be less than about 0.2 percent. Thus, YBC emissions could be expected to have a limited effect on ozone concentration peaks or patterns downwind of the site.

Evidence supporting this conclusion is found in the report by Deuwer, et al (1975) of a verification study of a photochemical model (LIRAQ-2) for the San Francisco Bay area. This model has a maximum resolution of a 2 km square 31/ but, for analyzing peak concentrations at distances of the order of 50 km from YBC, the model resolves only 5-km squares (25 km^2). Thus, with the maximum potential resolution (which is deemed realistic in terms of dispersive mixing expected), YBC emissions represent less than 5 percent of the emissions of a single grid cell. At 60 km downwind, less than 10 percent of YBC's 5 percent would remain in the most directly downwind cell. Most of the YBC emissions would be spread in surrounding cells and most of the material in the downwind cell would have come from cells other than that containing the YBC site. Modeling results reported by Duewer, et al. (1975) confirm these observations.

As another demonstration of the limited sensitivity of Bay Area ozone patterns to YBC emissions, SAI conducted photochemical modeling for YBC. Because the study was intended only to examine this sensitivity, the use of a full scale grid model was not deemed appropriate. Instead, a trajectory model was used. The model performs the same photochemical reaction analysis as a grid model but examines only those grid locations along the trajectory (wind "path") of the reactive pollutant plume passing through the YBC site. YBC site emissions at full development were used, as were the 1988 emissions without a project (base year emissions).

Analysis of ozone formation was conducted for two trajectories 32/ passing through downtown San Francisco in the vicinity of YBC site; one traversing the Bay and proceeding eastward over Oakland and into Livermore, the other moving southeastward over portions of the Bay and into San Jose. The trajectories used are indicated in Figures 1 through 4 in Appendix F. Note that most of the YBC-San Jose trajectory is over the Bay. Thus, a larger fraction of the material arriving at San Jose came from YBC than would be the case with a trajectory that followed the bay shoreline with its road network.

The results of the modeling for each trajectory are presented in Appendix F, Figures 7 through 10. Figure 8 there presents the ozone concentrations for the San Francisco to Livermore trajectory; Figure 10 presents the ozone concentrations for the San Francisco to San Jose trajectory. These curves indicate that the model predicts an ozone concentration of about 0.125 ppm in the vicinity of Livermore and a concentration of about 0.095 ppm in the vicinity of San Jose. The corresponding concentrations of NO_2 (Figures 7 and 9, Appendix F) are about 0.065 ppm at Livermore and about 0.075 ppm in San Jose. The trajectory passing over San Jose indicates a distinct and sharp rise in the NO_2 concentrations (Figure 9) as the air parcel approaches the city, corresponding to increased NO_x emissions there. The emitted NO_x reacts with the ozone, resulting in a somewhat depleted ozone concentration in the vicinity of the city, and this may again be observed in the shape of the ozone curve (Figure 9).

For purposes of comparison, the concentrations predicted at Livermore and San Jose are shown in Table VI.G.10. The table shows that reduction in the emissions reduces ozone and nitrogen dioxide concentrations by no more than one part per billion (ppb). One ppb is below the expected accuracy limits of the computation. The data indicate that downwind ozone and nitrogen dioxide concentrations would not be sensitive to the changes in the emissions at the YBC site which may be brought about by the Project.

TABLE VI.G.10. TRAJECTORY MODEL PREDICTIONS OF OZONE AND NITROGEN DIOXIDE CONCENTRATIONS

	Concentration (ppm)			
	Livermore (San Francisco to Livermore Trajectory)		San Jose (San Francisco to San Jose Trajectory)	
Simulated Emissions	Ozone	Nitrogen Dioxide	Ozone	Nitrogen Dioxide
1988 Base Year	0.124	0.063	0.094	0.078
Emissions at YBC grid reduced by difference between YBC project emissions in 1988 and "Base Year" 1988 emissions	0.123	0.062	0.094	0.078
Emissions at YBC grid reduced by twice the above difference	0.123	0.063*	0.093	0.077

*The rise here is a result of the complicated chemistry of oxidant formation. Sometimes an increase in source emissions of one or the other primary ingredient (hydrocarbons or nitrogen oxides) can lead to a reduction in oxidant (ozone) level at a particular downwind point.

HUD Air Quality Guideline Criteria

The air quality criteria used by HUD as guidelines to evaluate the acceptability of an area for housing are shown in Table VII.G.11. below:

TABLE VII.G.11. HUD THRESHOLD GUIDELINE CRITERIA 33/

1. If the concentration of pollutant exceeds 140 percent of standard, the site is not recommended for residential use.

2. If the concentration ranges from 1.0 to 1.4 times the standard, designation of outdoor space at the site for recreation or rest, especially for children or the elderly, is not recommended. Building construction requires special techniques.

3. If the concentration ranges from 0.7 to 1.0 times the standard, some precautions must be taken in design, construction and use of the property.

4. If concentrations are lower than 0.7 times the standard, traditional construction methods and unrestricted use of the property are possible.

Pollutant concentrations in Tables VII.G.7 and VII.G.8 for the YBC open areas after project completion, when compared to the HUD criteria, indicate the following (unless air quality can be effectively mitigated):

If the current EPA calculation methods in publication AP-42, Supplement No. 5 emission factors are used;

- Carbon Monoxide concentrations will range between 0.7 to 1.0 times the 8-hour standard in 1980, and 1988.

If the EPA proposed calculation methods in publication AP-42 revised Supplement No. 5 emission factors are used;

- Carbon Monoxide concentrations in 1980 will range between 1.0 to 1.4 times the 1-hour standard at all of the sensitive receptor locations; concentrations will range above 140% of the 8-hour standard at all sensitive receptor locations.

- Carbon Monoxide concentrations in 1988 will range between 1.0 and 1.4 times the 1-hour standard, and above 140% of the 8-hour standard at all sensitive receptor locations.

For purposes of this EIS, HUD is utilizing emission factors in EPA publication AP-42 revised Supplement No. 5 (draft) because it reflects more recent data on catalytic converters in automobiles and is expected to be made effective in late 1978.

For other pollutants, application of the criteria indicates the following:

- Nitrogen dioxide concentrations will range between 1.0 and 1.4 times the annual average standard in 1980, and above 1.4 times the standard in 1988.

- Sulfur dioxide concentrations will range between 1.0 and 1.4 times the 24-hour standard in 1980, and will exceed 140% of the standard in 1988.

- Total suspended particulate (TSP) concentrations will range between 0.7 and 1.0 times the 24-hour standard in 1988. The annual geometric mean (AGM) concentrations will be between 0.7 and 1.0 times the standard in 1980 and between 1.0 and 1.4 times the standard in 1988.

- Oxidant concentrations vary widely from year to year depending upon meteorological conditions (inversions) and range from below 0.7 times the 1-hour standard in some years to above 1.4 times the standard in other years.

The above comparison against HUD air quality criteria indicates that air quality as completion of the Convention Center in 1980, or at full development in 1988, is such that the project area is not recommended for residential use without acceptable mitigation. In fact, carbon monoxide concentrations, which will range between 179% and 200% of the federal 8-hour standard in 1988 (using AP-42 revised Supplement 5), indicate that severe health effects could result from residential development in this area, especially for the elderly and for children, unless extensive mitigation is used. These health effects are discussed in the following section. Mandatory air quality mitigation measures applicable to all housing within YBC which will prevent these health effects are discussed later in this assessment.

Health Effects of Air Pollutants in the Yerba Buena Center Area

Carbon monoxide health effects are indicated by the following quotations in a publication by the U. S. Department of Health, Education and Welfare (HEW): 34/

> "An exposure of 8 or more hours to a carbon monoxide concentration of 12 to 17 mg/m^3 (10 to 15 ppm) will produce a blood carboxyhemoglobin level of 2.0 to 2.5 percent in nonsmokers. This level of blood carboxyhemogloblin has been associated with adverse health effects as manifested by impaired time interval discrimination."

> "There is some epidemiological evidence that suggests an association between increased fatality rates in hospitalized myocsrdial infarction patients and exposure to weekly average CO concentrations of the order of 9 to 16 mg/m^3 (8 to 14 ppm)."

> Note: Maximum 8-hour concentrations shown in Table VII.G.8 are between 16.12 ppm and 17.99 ppm depending upon location within YBC. This indicates potentially serious health effects due to CO.

From the above quotations, it can be seen that CO has a cumulative noxious effect in the blood. The one-and-eight-hour-average standards are intended to reflect this and are supposed to represent roughly equivalent CO concentrations in the blood. Children in active play are especially affected because the ratio of their lung capacity to body size is approximately three times that of adults.

While a violation of either the one- or eight-hour standard is serious, it might seem at first that no individual would be present at the location of a violation of the eight-hour standard for that period of time, so the full effect of the violation might not be felt. However, since the Project includes commercial, office and residential indoor space, as well as recreation and travel space outdoors, it is expected that some people would be within the YBC area for substantial periods of time. In particular, housing for the elderly and market rate housing would provide a situation where some tenants might be expected to occupy their quarters most or all of each day. Office tenants might be expected to occupy their space for approximately an 8-hour period. Their occupancy would normally overlap at least a portion of the morning and/or evening "rush" hour.

Total suspended particulate health effects indicated in a HEW publication 35/ are as follows:

> "The lowest particulate levels at which health effects appear to have occurred in this county are reported in studies of Buffalo and Nashville. The Buffalo study clearly shows increased death rates from selected causes in males and females 50 to 69 years old at annual geometric means of 100 mg/m^3 and over. The study suggests that increased mortality may have been associated with residence in areas with 2-year geometric means of 80 mg/m^3 to 100 mg/m^3."
>
> Note: The annual geometric mean concentration for particulate in YBC will be approximately 80.7 ug/m^3 in 1988, indicating minor health effects.

Oxidant health effects include: 36/

Exposure	Duration	Health Effect
0.13 ppm	Maximum daily value	Aggrevation of respiratory diseases - asthma
0.10 ppm	Peak values	Eye irritation

> Note: Maximum 1-hour concentrations of oxidant in YBC will range from .05 to .13 ppm, indicating minor health effects.

Nitrogen dioxide health effects are as follows: 37/

> "Adverse health effects, as evidences by an increased incidence of acute respiratory disease, have been observed in family groups when the mean 24-hour NO_2 concentration measured over a 6-month period was between 117 and 205 mg/m^3 (0.062 and 0.109 ppm) and the mean suspended nitrate level was 3.8 mg/m^3 or greater."
>
> Note: Annual average nitrogen dioxide concentrations in YBC are estimated at .061 ppm in 1980 and .092 ppm in 1988, indicating little or no health effects due to NO_2.

Sulfur dioxide health effects 38/ may occur at 24-hour mean concentrations of 500 mg/m^3 (0.19 ppm), with low particulate levels. These health effects would include increased mortality rates. Maximum 24-hour concentrations of SO_2 in YBC are estimated at 0.17 ppm in 1980 and 0.322 ppm in 1988, indicating possible adverse health effects due to SO_2.

Hydrocarbon emissions do not have any direct health effects, but contribute to the formation of oxidant 39/.

Parking space deficiencies within the YBC area could result in additional air pollution due to traffic congestion. The transportation assessment indicates that an existing supply of 5800 parking spaces within the YBC area will, for the most part, have to be located elsewhere. Also, the parking deficiency for YBC cited in the Transportation assessment is 4800 spaces resulting in a total deficiency of 10,600 parking spaces. The transportation assessment discusses parking within the YBC area and other transportation related concerns.

Mitigation of Changes in Local Climate

Measures to reduce the effects of wind and shadows and decrease discomfort of pedestrian and park visitors could be developed at several scales, varying from changes in land use or building location/design to construction of small wind barriers. These measures could be developed in appropriate detail after a final plan is adopted and designs are proposed. A brief discussion of possible mitigation considerations, including a Redevelopment Agency commitment, is presented here to provide a basis for design.

A variety of modifications can reduce exposure to wind and shadow. Building height, shape, bulk, width, orientation, surface treatment and location with respect to other structures can all affect winds and shadows. Generally, a reduction in building height above neighboring buildings would result in smaller wind speed increases 40/. "Slabs" at right angles to prevailing winds create the greatest increases in wind speed and turbulence at street level 41/. (Turbulence is greater if there is a low, parallel slab upwind of the higher slab; for example, across the street. In such a situation, winds pass over the low slab and form turbulent eddies between the two structures.) Orientation of a "slab" structure so that the long axis would be roughly east to west would be better than north-south orientation in downtown San Francisco,

for normal winds. The Redevelopment Agency is publically committed by its own publication (EIR) to require developers of highrise structures to conduct microclimate analysis, including wind-tunnel studies, to determine impacts on pedestrian comfort and to provide a basis for design modifications to mitigate those impacts.

Landscaping is not an effective method of solving turbulence problems, but may be used to create local areas of shelter. To be most effective, vegetation should be dense and should extend from near ground level to at least 15 feet high. While any vegetation absorbs some of the momentum of the air and reduces winds, selection of plant type for wind stamina and appropriate height, and appropriate spacing and orientation, are necessary to maximize the potential mitigating effect. Such measures are properly a part of design review for individual structures and for YBC as a whole. The Redevelopment Agency has retained the architectural firm of Skidmore, Owings and Merrill (SOM) to assist it in such review and to develop landscaping guidelines.

Bus shelters would increase pedestrian comfort by offering protection from wind and rain. Their construction would involve cooperation among the Redevelopment Agency, the Muni, and the Department of Public Works. No plans currently are known to exist.

Construction Emission Mitigation

Reduction of dust generated by excavation and other construction activities may be achieved by using construction-industry-accepted methods of dust control, such as watering. Reclaimed water might be available after 1982 from the proposed Southwest Treatment Plant. Before that time, it might be available from wastewater treatment plants in San Mateo County. CALTRANS is currently using tank-truck-delivered reclaimed water for freeway landscaping irrigation locally.

Chemicals have been used in some communities for dust control. They are characterized by their composition (polymer, resin, enzymatic, emulsion, surface-active agent, latex, etc.). Their use has been prohibited on San Francisco wastewater management projects, because of their potential effects on vegetation, contamination of humans and animals, and contamination of groundwater; therefore, HUD is requiring that chemicals not be used for dust control in YBC.

Dust generated by spoils-loaded trucks traveling along haul routes should be minimized by watering down load material before trucks depart, covering loaded material, and filling trucks to less than overflowing to prevent spilling.

No regulations concerning watering or other methods of on-site dust control for private projects are in effect. Standard Specifications, Section 108-17, April 1, 1977, Department of Public Works, apply only to projects under DPW direction (City projects). YBC construction contracts need to have such dust-control measures as part of the specifications

for all development within YBC (public or private). BAAPCD Regulation 2 requires that best available methods be used to control dust generation during construction. Measures indicated above would provide such control. The California Vehicle Code also provides for sanctions if material is spilled on roadways. HUD will require that the Land Disposition Agreements for YBC include a mandatory requirement that the construction contracts for all development in YBC must include adequate dust control measures which shall include, but not necessarily be limited to, watering of dust-generating areas of YBC.

Compliance with the Air Quality Maintenance Plan (Preliminary)

The Project complies with many of the policies and objectives of the preliminary Bay Area Air Quality Maintenance Plan (Environmental Management Program, September 1977, "Institutional, Legal and Financial Requirements for Implementing Proposed Air Pollution Control Programs.") These measures are as follows: 42/

Objective A-1: Reduce Long-Distance Auto Commuting (Between Sub-Regional Areas)

"Reduce current long-distance auto commuting and discourage urban development regionwide that results in more auto commuters in more urban areas. Induce more compact urban development in all urbanizing areas of the region through land management techniques. Recognize urban service commitments as incentives for compact development and disincentives for scattered development."

Policy 1: "Restrict the extension of new development to those locations with existing or committed sewer and water service."
Existing sewer and water service covers the entire YBC area, all of which is proposed for redevelopment in the Project.

Policy 3: "Encourage development of unimproved land within or next to urban areas with existing or committed urban services, relating this to sewer and water service capacities."
YBC is within an urban area with existing urban services and adequate service capacities.

Policy 5: "Encourage 'infill' development of bypassed vacant land within existing urbanized areas."
YBC is bypassed in the sense that it is now primarily an open area surrounded by urbanization. Redevelopment can be considered a form of "infilling."

Policy 6: "Increase housing and job opportunities in existing urbanized areas. Encourage public and private rebuilding into generally compatibly mixed land uses at higher densities."
The Project encourages public and private rebuilding into generally compatibly mixed land uses at higher densities.

The Project provides additional housing. In addition, the Project provides additional jobs for the YBC area.

Objective B-1: Reduce the Number of Auto Trips and Increase Transit Usage

"Reverse the trend of more auto trips and less transit usage. Use land management techniques and service commitments as incentives for higher density development. In all new land development regionwide:

--Promote high density development that is supportive of transit usage.

--Discourage low density development that promotes automobile dependency."

Policy 9: "Encourage higher density development in urban areas where existing or committed urban service capacities, including rail transit, can support higher densities."

The Project represents high-density development in an area served by a network of transit lines, including BART and SP (rail transit).

Objective B-2: Reverse the Trend of More Auto Usage

"Use land management techniques to achieve a better balance of housing, commerce and industry in each urban area."

Policy 12: "Encourage a mixture of residential/commercial/ industrial development types in all communities."

The Project contains a mix of residential, commercial (including office and retail commercial) and light industrial uses.

Policy 13: "Discourage new large-scale land development projects that are exclusively commercial, industrial or residential."

The Project would produce more than one type of land use.

Mitigation of Air Quality For Housing

As identified under "Impacts - Air Quality," pollutant concentrations, especially carbon monoxide, will exceed the "140% of standard" threshold cited in the HUD air quality criteria of Table VII.G.11.

HUD will provide subsidies for housing and/or mortgage insurance within YBC provided extensive air quality mitigation, as specified in this section, is implemented; i.e., special methods of housing construction are required for HUD subsidized or insured by HUD in YBC to mitigate interior air quality to within Federal air quality standards. Restrictions on outdoor activities are necessary to limit the exposure of future housing residents to exterior air within YBC. Tennis courts, swimming

pools and play areas for children would result in outdoor activities causing hyperventilation of polluted air resulting in adverse health effects, especially for the elderly, children, and individuals with health problems such as asthma and cardiac conditions.

In order to meet HUD requirements, all housing within the YBC area must be mitigated in accordance with the following:

For interior air quality mitigation;

- Introduction of outside air (by mechanical ventilation) for circulation within the structure is required but shall be reduced to the absolute minimum required for oxygen supply to inhabitants, for combustion, and for reduction of odors within the structure. This value is usually about 7 cubic feet per minute per inhabitant. 33/

- Housing units shall be at the second level or higher unless the developers design demonstrates to HUD that street level carbon monoxide is satisfactorily excluded from housing interiors by means of positive pressure inside the building, seals on windows and doors, and/or other means to be approved by HUD.

- Where individual forced-air heating is used for each dwelling unit, a summer-switch shall be provided for recirculation of air.

- Electric ranges shall be used in lieu of gas ranges (because gas ranges increase interior concentrations of carbon monoxide).

- Venting of housing structures shall be separated from air intakes by a minimum of 15 feet.

- Air intakes to housing structures shall be elevated a minimum of 10 feet above the street level.

- Particulate filtration shall be provided at all air intakes.

- There shall be no direct access from parking areas to dwelling units through a common doorway.

To mitigate exterior air quality, or reduce the effect of that air quality on humans;

- No active outdoor areas (play areas for children, tennis courts, swimming pools, etc.) are to be provided. Passive open areas (patios, balconies, etc.) are acceptable.

- Arrangement of structures shall encourage adequate flushing action through movement of prevailing winds.

HUD is requiring these to be part of the Land Disposition Agreements for all housing land uses within YBC.

Mitigation of Air Quality for Non-Housing Areas of YBC

For the Convention Center and other nonhousing interior spaces;

- Minimum outside air intake (as specified for housing mitigation discussed above) is recommended. (HUD consultations with Convention Center mechanical engineering consultants 43/ indicate a full awareness of air quality concerns and plans are being prepared to mitigate properly)

For all areas within YBC, the following is recommended;

- Grading that creates low-lying areas, in which pockets of heavier-than-air pollutants (sulfur oxides being the heaviest of the common pollutants) could concentrate should be avoided. Below-grade plazas also would have this concentrating effect.

The San Francisco Department of Public Works will enforce ventilation requirements contained in the Uniform Building Code. In addition, California OSHA will enforce OSHA air quality standards which relate to non-housing areas 49/.

Stationary Source Air Quality Mitigation Requirements

Major stationary sources (as defined and listed by BAAPCD) do not exist in the YBC area at present; however, the Project provides for additional light industry at full development. BAAPCD, as the local agency responsible for enforcement of stationary source emission regulations, should be notified early in the planning and design of specific point sources, to ensure compliance with applicable emission control regulations. In any event, BAAPCD would have to be approached for permits for major stationary sources, including (potentially) large office building, if fuel combustion is greater than specified limits (BAAPCD Regulation 2 and Regulation 13).

In general, mitigation of air pollution impacts associated with stationary-source fuel combustion would require the resource use (energy) mitigation measures of Section VII.I, coupled with the use of cleaner fuels and emission controls. The latter two would most likely come from EPA/ARB/BAAPCD regulations about fuel selection (and clean up of fuels at their source) and about emission controls on combustion equipment (boilers).

Federal Assistance for Mitigation of Existing Air Quality

Federal policy as recently set forth in Section 176(d) of the Clean Air Act Amendments of 1977 states that Federal agencies shall give priority to certain projects that will mitigate air quality. Specifically:

> "Each department, agency, or instrumentality of the Federal Government having authority to conduct or support any program with air-quality related transportation consequences shall give priority in the exercise of such authority, consistent with statutory requirements for allocation among States or other jurisdictions, to the implementation of these portions of plans prepared under this section to achieve and maintain the national primary ambient air quality standard. This paragraph extends to, but is not limited to authority exercised under the Urban Mass Transportation Act, title 23 of the United States Code, and the Housing and Urban Development Act."

The primary source of emissions resulting in degraded air quality in the YBC area is existing automobile traffic, both on the adjacent James Lick Freeway and on city streets in San Francisco. As discussed earlier, the pollutant of greatest concern is carbon monoxide. Therefore, any transportation improvement projects that will serve to reduce vehicular emissions in the YBC area should receive highest priority for federal assistance from agencies under the U. S. Department of Transportation. These federal agencies in San Francisco are the Federal Highway Administration (FHWA) and the Urban Mass Transit Administration (UMTA).

It is suggested that the above transportation improvement projects be included in the program to be developed by the State by January 1, 1979 for attainment of the air quality standards to further assure that DOT agencies will give priority to those projects under the above cited Section 176(d) of the Clean Air Act Amendments.

Specific capital improvement projects for transportation systems in San Francisco are listed in the "1977-78 Transportation Improvement Program (TIP) for the Nine County San Francisco Bay Area" dated July 22, 1977. This document was prepared by the Metropolitan Transportation Commission (MTC) acting in cooperation with FHWA and UMTA, with input from CALTRANS, Sam Trans, AC Transit, MUNI, Golden Gate Transit, BARTD and governmental agencies including the City and County of San Francisco. The City and County of San Francisco provides input to the TIP through their Transportation Planning Group which coordinates efforts of the City Planning Department, Public Works and MUNI.

For a transportation improvement project to be effective in mitigating air quality (reducing vehicular emissions) it should have the following effect:

- Reduce congestion on city streets and freeways; i.e., reduce idling emissions,

- Encourage use of transit through positive incentives such as improved (or expanded) service,

- Substitution of transportation equipment which has reduced emission rates.

Some specific types of transportation improvement projects which are currently in the Transportation Improvement Program and would mitigate air quality in San Francisco and/or YBC are summarized in Table VII.G.12.

James Lick Freeway traffic adjacent to Yerba Buena Center is a prime contributor to high carbon monoxide concentrations in the Project area. The local impact of these freeway emissions in YBC could be greatly reduced if a significant portion of the Bay Bridge traffic (170,000 vehicles per day 44/) were by-passed from the Bay Bridge away from the Project area to Interstate 280 without passing by YBC. Such a connection would substantially reduce the "maximum consecutive eight hour traffic" and increase the "average link speed" on James Lick Freeway adjacent to YBC, thereby reducing the local impact of CO from the Freeway 45/. This freeway link will not generate any additional freeway traffic along the James Lick Freeway and existing portions of I-280 because it is not a destination; instead, regional air pollution would be benefitted by improving traffic flow efficiencies.

Figure VII G.3 from a San Francisco Department of City Planning study 46/ shows the route of one alternative connection from I-280 to the Bay Bridge which would divert freeway traffic away from housing in YBC through an area that is basically industrial.

An alternative connection from I-280 along the 6th Street Corridor to James Lick Freeway would not divert traffic away from YBC and is, therefore, not desirable for mitigation of CO concentrations in the Project Area. Also, it would not bypass the intersection of James Lick Freeway and the Embarcadero Freeway, which contributes to congestion adjacent to YBC.

Because the above connection of I-280 to I-80 has been specifically identified by CALTRAN as one of the "gaps" remaining to be completed in the interstate highway system, the approximately one mile of interstate highway required to connect I-280 to I-80 should receive high priority for Federal funding by virtue of Section 102, paragraph (b)(1) of the Federal Aid Highway Act of 1976 which reads as follows:

> "(b)(1) At least 30 per centum of the apportionment made to each State for each of the fiscal years ending September 30, 1978, and September 30, 1979, of the sums authorized in subsection (a) of this section shall be expended by such State for projects for the construction of intercity portions (including beltways) which will close essential gaps in the Interstate System and provide a continuous System."

More than 90% of the funding for the connection of I-280 to I-80 would be federally funded, with the balance funding by the State of California 47/; therefore, no funding is required by the City and County of San Francisco for completion of this intercity portion of the interstate highway system. A project for connection of I-280 to the Bay Bridge is

Table VII.G.12 Types of Transportation Improvement Projects Currently in the Transportation Improvement Program (TIP) (San Francisco County Only)

Project Description	Lead Agency	Program Year	TIP Reference
405911; Fourth Street On-Ramp (construct on ramp to I-280)	CALTRANS	1977-78 1978-79	Page 5-143 and 5-144
2070A1, Third Street to the Embarcadero (construct freeway ramps)	CALTRANS	1977-78 1979-80	Page 5-145 and 5-146
Relocate Electric Trolley Wires/New Trolley Routes	MUNI	1977-82	Page 4-23 and 4-24
Rerail and Extend "M" Line	MUNI	1977-78	Page 4-23 and 4-24
Purchase of 40 Foot Diesel Buses	AC Transit	1977-82	Page 4-27 and 4-28
Propulsion Motor Modification	BARTD	1977-78	Pages 4-39 and 4-40
Automatic Train Control	BARTD	1977-79 and 1980-81	Pages 4-43 and 4-44

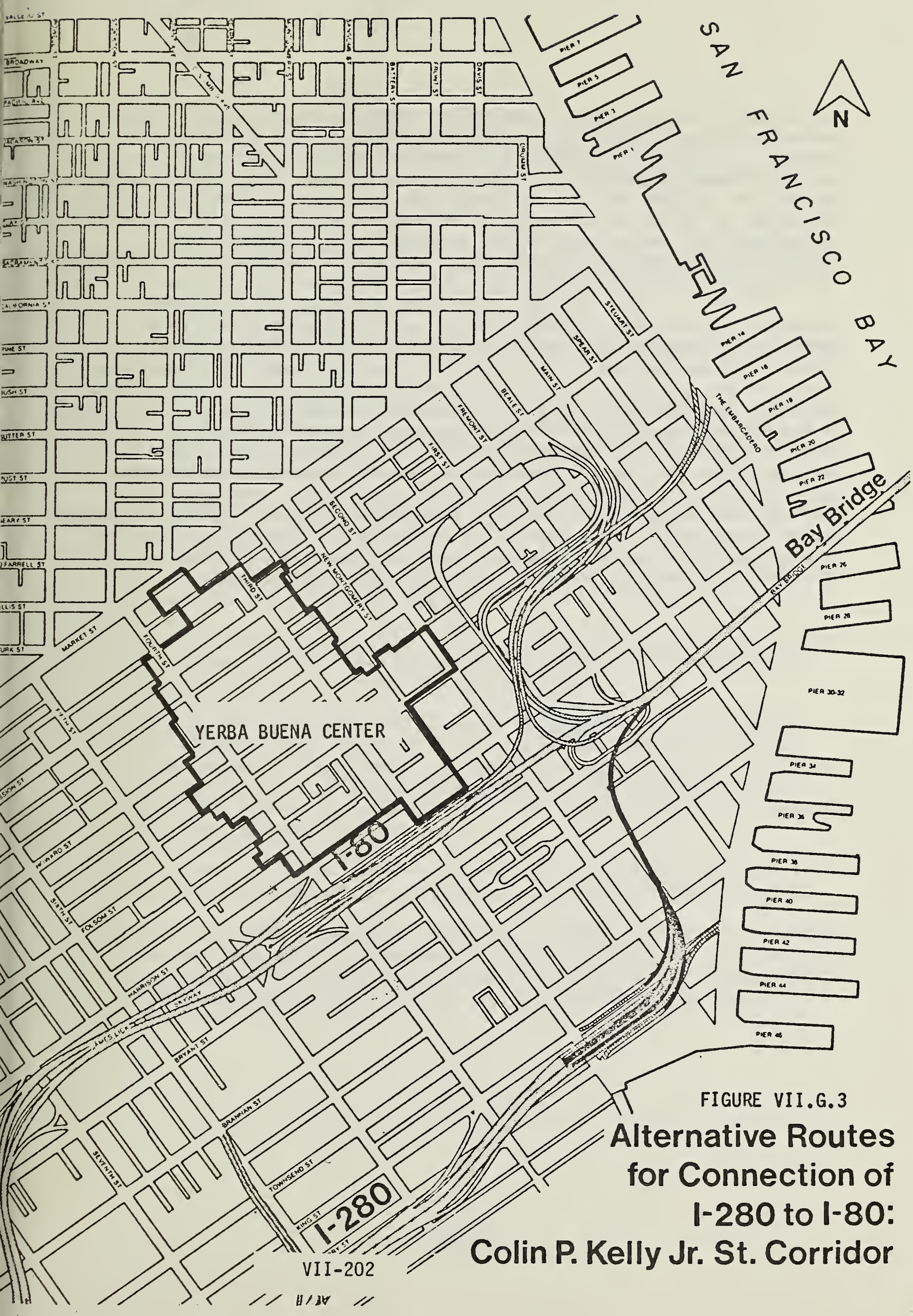


FIGURE VII.G.3

Alternative Routes for Connection of I-280 to I-80: Colin P. Kelly Jr. St. Corridor

not currently in the Transportation Improvement Plan prepared by MTC. Authorization was issued by the City and County of San Francisco on January 11, 1978 48/ for CALTRANS to proceed with preparation of an EIS for the freeway connection. Federal funding of over 90% of this connection may be lost (unless the freeway connection is "under agreement" prior to September 30, 1990) as indicated in the policy set forth in the Federal-Aid Highway Act, as amended, which declares congressional intent to complete the interstate system by September 30, 1990 (23 U.S.C.A. Section 101(b)).

Completion of the above freeway link is not considered by HUD to be mandatory air quality mitigation for YBC; however, in view of high existing concentrations of CO in the YBC area, the substantial negative impact of the vehicular traffic along James Lick Freeway on these concentrations, the benefits of the above proposed interstate highway connection in mitigating these local CO concentrations, and various Federal policies, it is recommended that CALTRANS expedite preparation of an EIS/EIR for the connection of I-280 to I-80 along a route that will divert traffic away from YBC at the Bay Bridge. In addition, it is recommended that the City and CALTRANS include the recommended interstate highway connection in the Transportation Improvement Program with the highest priority for Federal and State funding, thereby precluding loss of approximately $40,000,000 of Federal assistance for this construction work.

Footnotes

1/ July 1975-June 1977, inclusive.

2/ U. S. Department of Commerce, 1973, National Oceanographic and Atmospheric Administration, Local Climatological Data, Annual Summary with Comparative Data, San Francisco, CA.

3/ Winds are identified by the direction from which they come. A west wind blows from west to east.

4/ These statements and the remainder of this subsection are based on a San Francisco Department of City Planning Environmental Impact Report on the Home Office Building for State Compensation Insurance Fund, 9th and Market Streets dated November, 1974.

5/ See Tables 1 and 2, Appendix E.

6/ See Table 4, Appendix E.

7/ See Tables 1 and 4, Appendix E.

8/ An "inversion" is the phenomenon of a layer of warm air over cooler air below, in which pollutants cannot be dispersed through the layer of warm air and are, in effect, trapped.

9/ This station is located on the roof of the nine-story building. While measurements there give an unambiguous picture of daily, seasonal and annual trends, as related to meteorology, it is not clear how well a given measurement or a series of measurements represent conditions at street level in the vicinity of the station, much less elsewhere in the City.

10/ Low-level radiation inversions result when the earth radiates its heat to the night sky, thus cooling itself and the surface air.

11/ The Environmental Management Task Force (EMTF) consists of representations from several governmental agencies in the Bay Area including the Assoc. of Bay Area Governments (ABAG), the U. S. Environmental Protection Agency (EPA) and the Bay Area Air Pollution Control District (BAAPCD).

12/ Isopleths--lines drawn on maps connecting points of equal pollutant concentrations.

13/ A complete copy of the HUD isopleths and supporting documents is on file with the HUD San Francisco Area Office, Environmental Staff. A brief description appears in Appendix E.

nc

14/ Minor stationary sources are listed in Table 7, Appendix E.

15/ BAAPCD, "Guidelines for Air Quality Impact Analysis of Projects," 1975.

16/ A detailed description of the BAAPCD guideline approach including computation forms is available in the files of the Environmental Staff Unit, HUD San Francisco Area Office.

17/ Base year concept assumes traffic in the Yerba Buena Center area will increase in future years, independently of Yerba Buena Center development. In analysis of the Project, base year traffic is added to the net increase in traffic estimated to be produced by the Project. Thus the concentration estimates for the Project in the 1980 and 1988 time frames include the base estimates.

18/ The one-kilometer square area is defined as that area between Market Street and Bryant Street inclusive, and between Fifth Street and the approximate vicinity of First Street (First Street traffic is not included).

19/ Per telephone conversation between C. H. Kenaston (HUD) and Mike Kim (BAAPCD) of December 14, 1977.

20/ Letter from the California Air Resources Board (CARB) to U.S.E.P.A. Region IX dated December 2, 1977.

21/ This would be during winter storms.

22/ Except where extra underground levels are proposed, as for the convention center, and possibly for office buildings. The 1973 EIR (Little, A.D., 1973) stated that the deepest excavation would be that for the then-proposed underground parking garage (-35 feet) in the sports arena/exhibit hall block.

23/ Per telephone conversation between C. H. Kenaston (HUD) and Jean LaMarre (Turner Construction Company) on December 14, 1977.

24/ Compilation of Air Pollutant Emission Factors," Second Edition, February 1976, and "Investigations of Fugitive Dust Sources, Emissions and Controls", May, 1976.

25/ For the contribution from streets at right angles to the freeway, the wind angle would be 67.5!. The guideline contribution would then be reduced by the factor (Sin 22.5!) (Sin 67.5!).

26/ EPA, 1974, "Guidelines for Air Quality Maintenance Planning and Analysis; Volume 13." Note: Computation forms used in the stationary source analysis are on file with the Office of Environmental Review, Planning Department, City of San Francisco.

27/ EPA, 1976, "Compilation of Air Pollutant Emission Factors, Second Edition".

28/ See Appendix F for technical discussion of oxidant formation.

29/ See Appendix F for assumptions and data used in the analysis.

30/ The geometric 3-dimensional envelope within which the emissions (and their reaction products) from one source exist as they are transported and dispersed by the winds.

31/ That is, it cannot distinguish differences inside any given 2-km square.

32/ Trajectory: a geographical path; in this case, the path in which NO_x and hydrocarbons are chemically changed to form oxidant.

33/ Environmental Protection Agency, 1974, "Air Pollution Considerations in Residential Planning", Volume I, Manual.

34/ U.S. Department of Health, Education and Welfare (HEW), 1970, "Air Quality Criteria for Carbon Monoxide".

35/ HEW, 1970, "Air Quality Criteria for Particulate Matter".

36/ HEW, 1970, "Air Quality Criteria for Photochemical Oxidants".

37/ HEW, 1971, "Air Quality Criteria for Nitrogen Oxides".

38/ HEW, 1969, "Air Quality Criteria for Sulfur Oxides".

39/ HEW, 1970, "Air Quality Criteria for Hydrocarbons".

40/ City of San Francisco, 1977, Planning Department, Draft Environmental Impact Report, 180 Montgomery Street.

41/ Turbulence is greater if there is a low, parallel slab upwind of the higher slab; for example, across the street. In such situations, winds pass over the low slab forming turbulent eddies between the two structures (SPUR, 1975).

42/ Environmental Management Program, September 1977 (Metropolitan Transportation Commission, BAAPCD, ABAG), "Institutional, Legal and Financial Requirements for Implementing Proposed Air Pollution Control Programs."

43/ Telephone conversation between (C. H. Kenaston (HUD) and Hideo Akagi (Mechanical Engineer, Hayakawa and Associates) on January 3, 1978.

44/ Reference: City and County of San Francisco map entitled "Twenty-Four Hour Traffic Flow on Principal Streets and Highways, 1974-1976."

45/ See the BAAPCD "Gudelines for Air Quality Impact Analysis of Projects," June, 1975; line source impact computation sheet (page A-5).

46/ San Francisco Department of City Planning, "A Transportation System for the Embarcadero Area," undated (approximately 1974).

47/ Discussion between C. H. Kenaston (HUD) and John Bates (FHWA) on January 13, 1978.

48/ City and County of San Francisco Transportation Policy Group letter to CALTRANS dated January 11, 1978.

49/ Carbon monoxide sensors should be used in garage areas to provide positive indication and control of violations of carbon monoxide standards. These CO sensors may also be used in the mixed air plenum of ventilation systems of non-garage areas to reposition the dampers when a preset level of CO concentration (nominal 9 ppm) is exceeded.

Environmental Setting

STREET PATTERN AND FUNCTIONS

For purpose of the traffic analysis, the study area has been expanded beyond the actual Yerba Buena Center project limits to include approximately the area bounded by Market to the north, Bryant to the south, and Bryant, First and Fifth Streets to the east and west respectively.

The James Lick Freeway (I-80), the San Francisco/Oakland Bay Bridge approaches (I-80), and the Embarcadero Freeway (Cal-480) provide high-capacity service to the system of streets in the South-of-Market area. Market Street borders the project on the north, and functions principally as a transit street and a major pedestrian way with thirty-five foot wide sidewalks and a fifty-foot roadway. Similar in function is Mission Street, one block to the south, which is a transit preferential street[3] with exclusive lanes for buses during the peak hours. Mission Street carries mixed vehicles and pedestrians. "Mixed vehicles" is a term used for the total flow of vehicular traffic, including autos, buses, trucks, etc. Mission Street and the other South-of-Market streets have standard sidewalk widths (10-15 ft.) and pavement widths (52-62 ft.). Howard and Folsom Streets, the remaining major eastwest streets within the project area are basically mixed vehicles arteries.

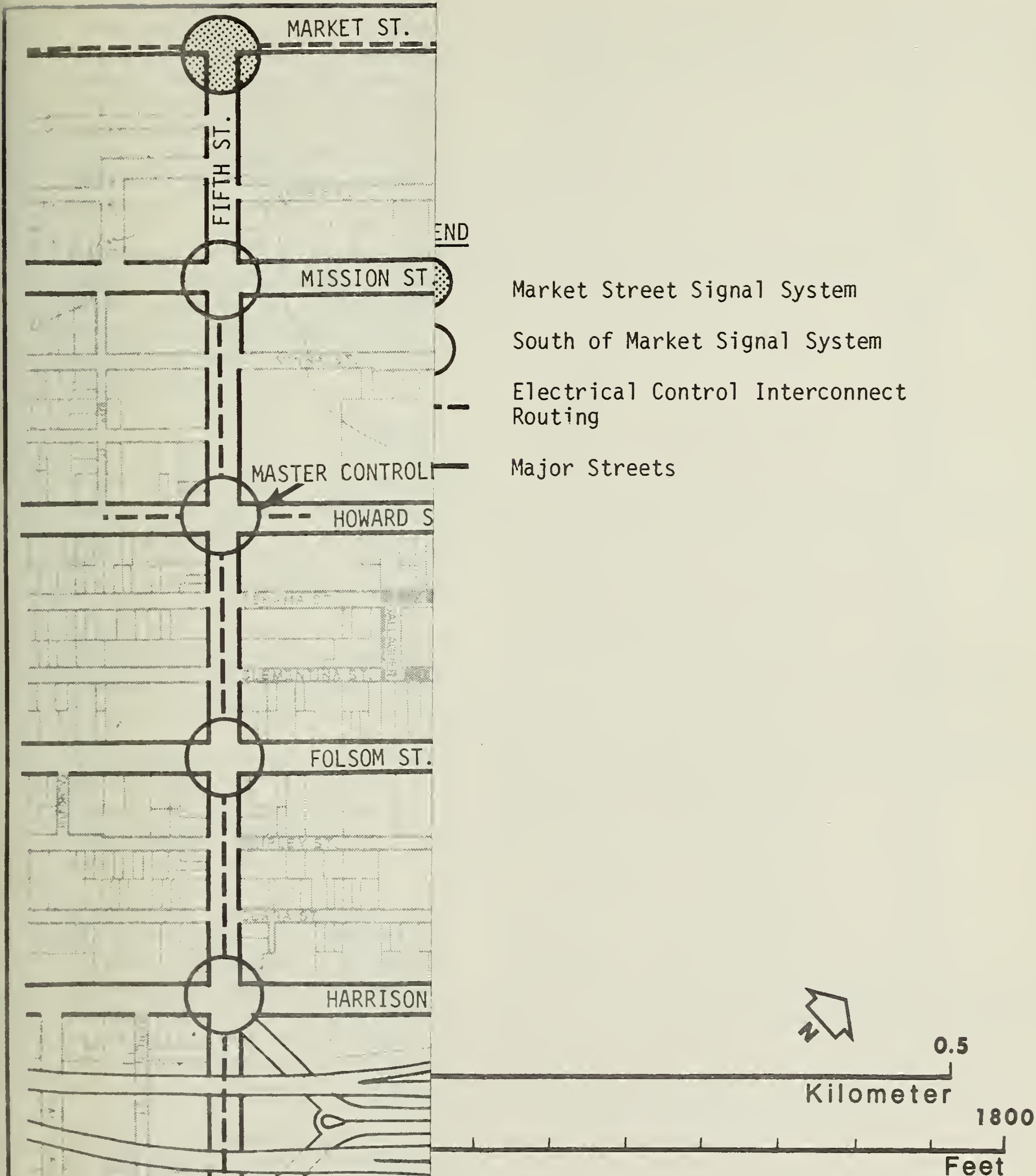
A recent addition to South-of-Market traffic management is the transit-preferential diamond lane pair on Mission Street. The curb lanes west of Fourth Street are reserved for buses and right turns during the morning and afternoon peaks (7-9 a.m. and 4-6 p.m.); between Fourth and Beale Streets, they are so reserved all day.

Fifth Street, like Mission Street, is a two-way street, but with less transit emphasis. The one-way streets in the area include the Howard and Folsom pair and the Harrison and Bryant pair, running in the east-west direction. Third and Fourth Streets form a principal north-south one-way pair.

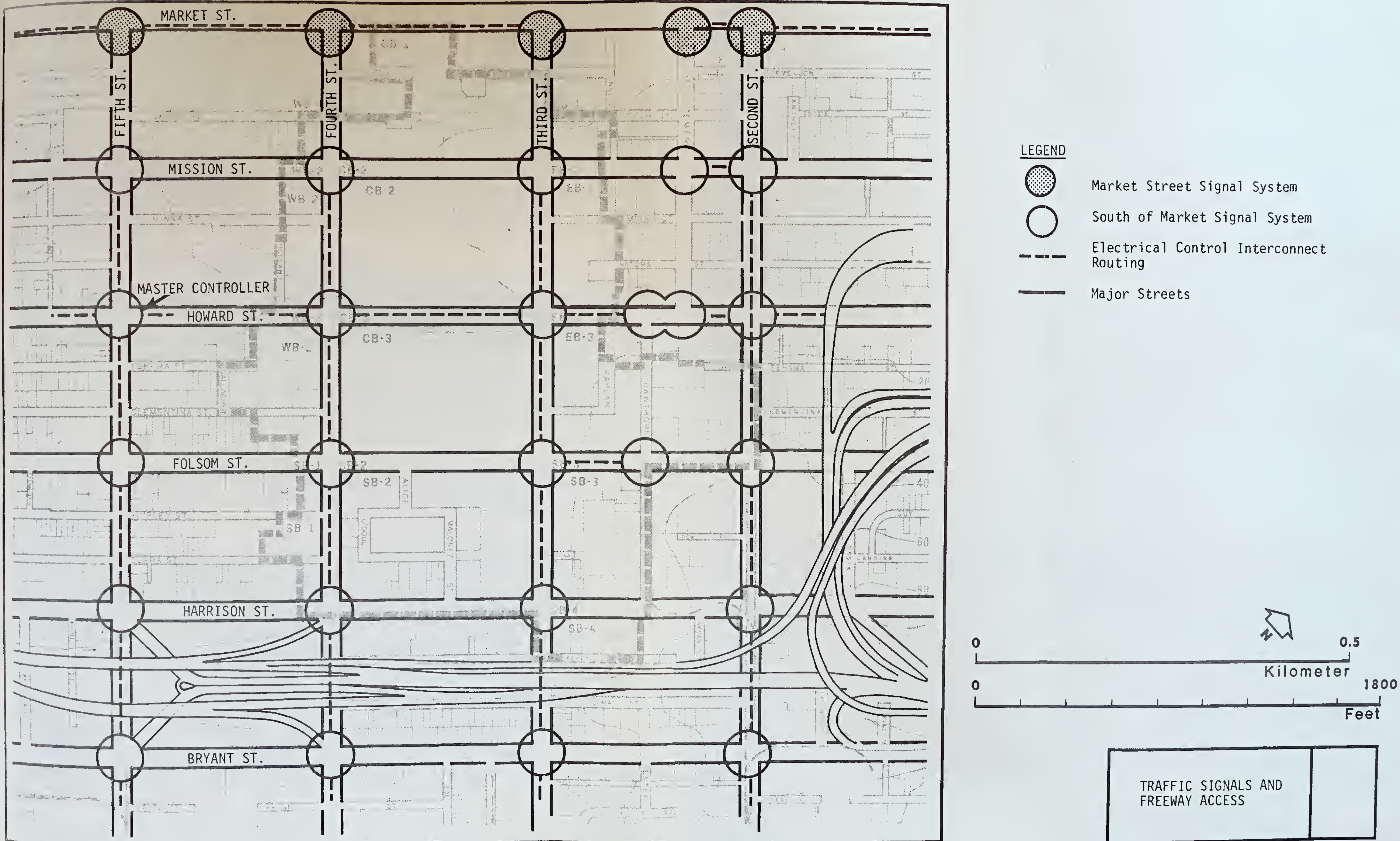
The principal access ramps to the James Lick Freeway are at Fifth Street and Fourth Street. To the east are the ramps at Harrison, First, Fremont, and Bryant Streets serving the San Francisco/Oakland Bay Bridge (see following figure). To the south, ramps at Sixth and Brannan Streets and Third and King Streets, the I-280 freeway, not shown on the figure.

REGULATION AND CONTROL

The principal traffic controls in YBC are the traffic signals. There are two separate signal systems; the Market Street signals and the South-of-Market signals, pre-timed in proportion to off-peak and peak period traffic volumes. The following figure shows the location of traffic signals in the YBC area.



TRAFFIC SIGNALS AND FREEWAY ACCESS



TRAFFIC SIGNALS AND FREEWAY ACCESS

There are turn restrictions within the project area, the most notable being the left-turn prohibitions on Market and Mission Streets. This form of regulation improves the traffic flow efficiency on these two-way streets and reduces the number of potential conflicts. At some locations, buses are excepted from the regulation. The turn prohibitions serve to discourage the use of Market and Mission Streets by automobile traffic destined for the Retail and Financial Districts while promoting transit movement. The result is improved efficiency for mixed-vehicle flow.

On-street parking regulations establish either parking time limits or peak hour towaway zones to clear additional lanes for moving traffic. Other forms of curb regulation establish bus stops, truck loading zones, passenger loading zones, and parking prohibitions where necessary for safety purposes. The succeeding figure shows the principal parking regulations.

TRAFFIC CHARACTERISTICS

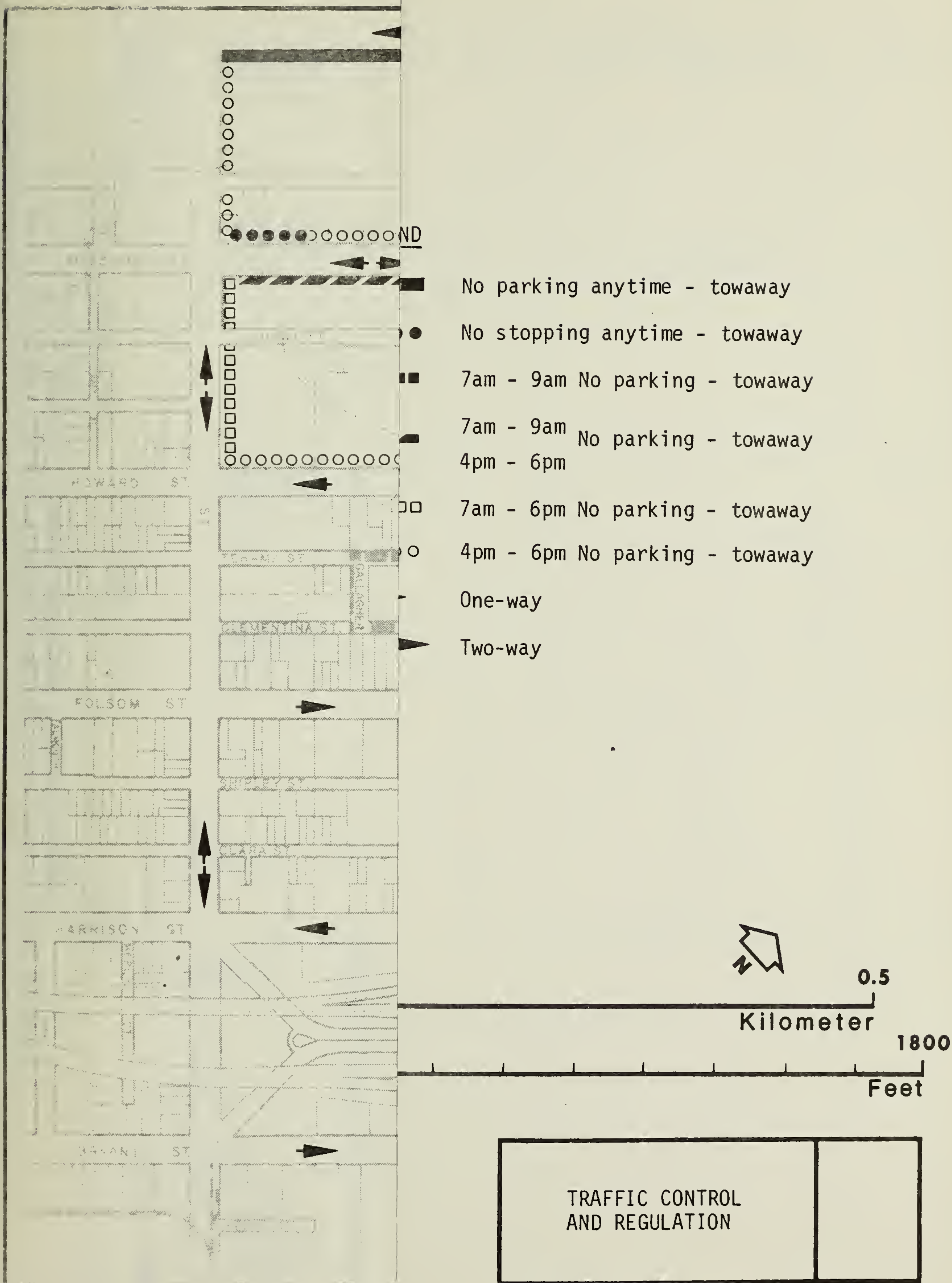
The movements of pedestrians, transit vehicles, automobiles, trucks and other vehicles all contribute to the transportation setting. Traffic characteristics are presented for the p.m. peak period and the nighttime period associated with potential convention center and recreation/ entertainment park activities.

Pedestrians. There is a varying level of pedestrian activity through the project area. Market Street sidewalks and crosswalks carry several thousand pedestrians per hour during the weekday and Saturday peak periods of noontime and afternoon shopping (12 noon to 3 p.m.).

The highest pedestrian volume observed in previous studies (1965)[1] was a two-way flow of 13,300 pedestrians per hour on the south side of Market Street near Powell Street. Although the street and land use patterns have changed since 1965,[2] "very high" pedestrian volumes still exist along Market Street.

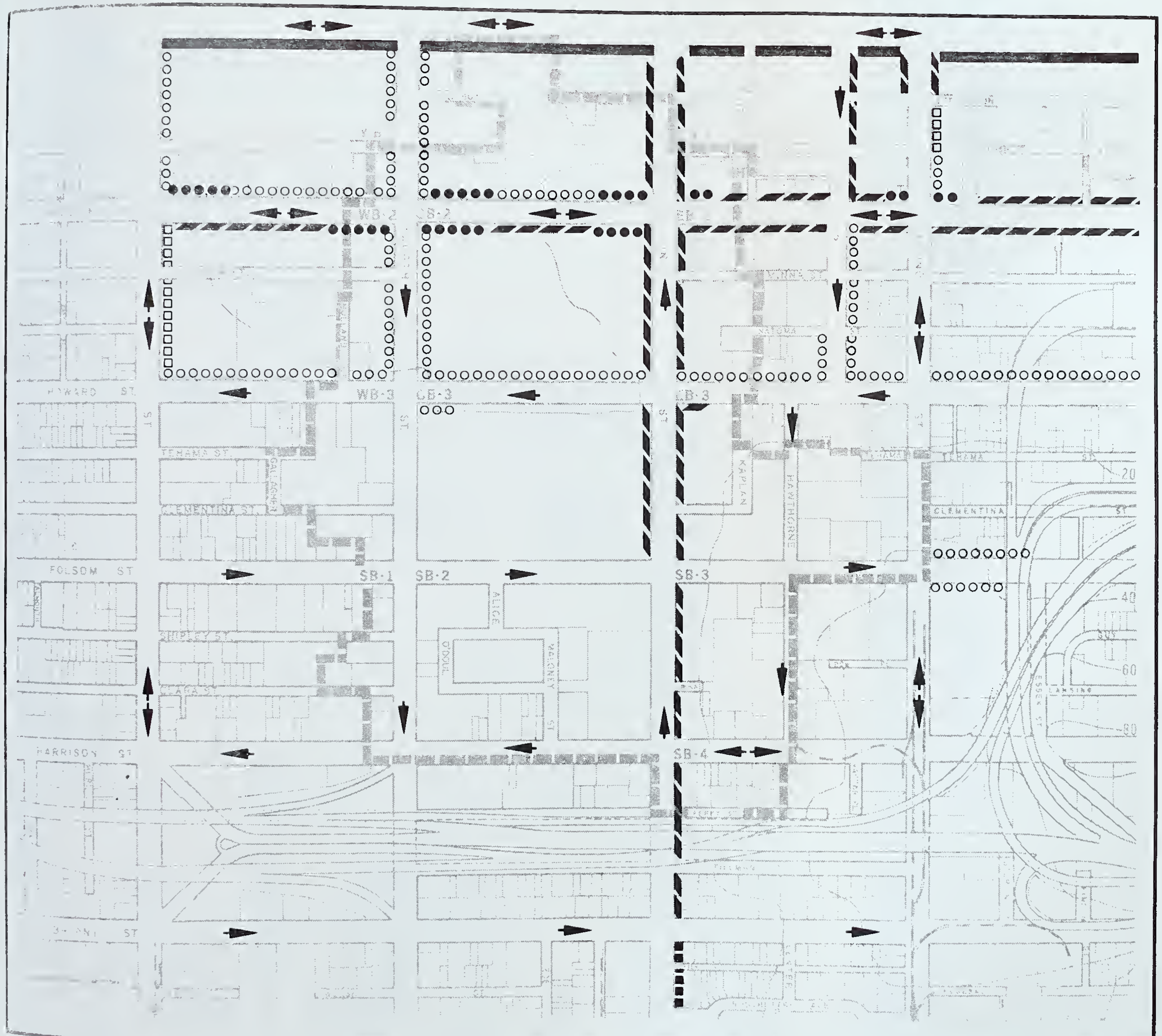
Mission Street sidewalks carry "200-500" pedestrians per hour,[2] as do the cross street sidewalks on New Montgomery, Third, Fourth, and Fifth Streets. Extending further south into the YBC area to Howard and Folsom Streets, the pedestrian volumes are moderate throughout the day. On other streets toward the outer limits of the YBC area, pedestrian volumes of less than 100 per hour are observed except for short peaks in the noon period and a surge of pedestrians along Third and Fourth Streets associated with Southern Pacific commute movements.

Transit. Several forms of transit serve YBC directly (pass through YBC) or indirectly (have terminals outside YBC). Market Street is the transit spine of San Francisco. Trains of the 75-mile system of the San Francisco Bay Area Rapid Transit (BART) District provide service to Daly City, Richmond, Concord, and Fremont, from the lower level of the Market Street subway. Beginning in 1979, the light-rail Muni Metro



TRAFFIC CONTROL
AND REGULATION

++Could be one-half the 4-6 p.m. capacity if available vehicles were used in the 7-8 p.m. period



LEGEND

- No parking anytime - towaway
- No stopping anytime - towaway
- 7am - 9am No parking - towaway
- 7am - 9am / 4pm - 6pm No parking - towaway
- 7am - 6pm No parking - towaway
- 4pm - 6pm No parking - towaway
- One-way
- Two-way

TRAFFIC CONTROL AND REGULATION

EXISTING TRANSIT CAPACITIES (PERSONS) (SCHEDULES CURRENT IN MID-JULY 1977)
ASSUMING TOTAL OF SEATED AND STANDEE* CAPACITY

TRANSIT AGENCY	VEHICLE CAPACITY (Persons/Unit) Seated	Standee	TOTAL WEEKDAY CAPACITY +++ P.M. PEAK (4-6 p.m.) IN	OUT	NIGHT (7-8 p.m.) IN	OUT
S. F. Municipal Railway						
Motor Coach	48	27	17,500	22,700	2,400	2,400
Trolley Coach	51	24	20,300	20,300	2,700	2,700
Streetcar	55	35	11,800	11,800	1,800	1,800
Cable Car	60		2,400	2,400	600	600
TOTAL			52,000	57,200	7,500	7,500
Southern Pacific R.R.**	100/150		-0-	10,000	-0-	-0-
SamTrans	53	12	500	500	130	65
Golden Gate Transit:						
Buses	45	10				
First Street Routes			300	9,700	-0-	-0-
Folsom-Howard Routes			1,000	1,600	200	300
Ferries: Larkspur, Sausalito +			4,200	3,400	1,300	800
Harbor Carriers, Inc.						
Tiburon Ferry +				1,000	-0-	-0-
BART:						
Transbay	72 ++	36	21,500	21,500	2,000	6,300
Westbay	72 ++	36	21,500	21,500	6,300	2,000
A-C Transit	48	12	6,400	17,600	800	1,000

*Standees were included where allowed by agency policy and contracts.
**Southern Pacific capacity is based on the assumption that all commuter rolling stock is in service; in practice, trains have only the number of cars needed to meet demand (9-10 cars per train). There are two types (sizes) of car.
+Larkspur Ferries - 750 persons/Ferry
Sausalito Ferry - 575 persons/Ferry
Tiburon Ferry - 350 persons/Ferry
++In peak hours, 10 cars per train. In off peak hours, as few as two cars per train.
+++Could be one-half the 4-6 p.m. capacity if available vehicles were used in the 7-8 p.m. period

transit vehicles of the San Francisco Municipal Railway (MUNI) system will operate in the upper level of the Market Street subway, and will provide service to the Sunset, Parkside, West-of Twin Peaks, Ocean View, Merced Height, Ingleside, Eureka Valley, Dolores Heights, and Noe Valley areas of the City. Most bus lines serving Eureka Valley, the Sunset, and parts of the Richmond and Western Addition districts pass along Market Steet.

Third and Fourth Streets, operating as a one-way couple, are used by north-south Muni bus lines serving the Southern Pacific Terminal, Hunters Point, Bayview, and Visitacion Valley to the south, and the Financial district, Union Square, Chinatown and North Beach to the north. Mission Street[3] carries most of the bus lines serving the Mission district, Glen Park, and the Outer Mission district. Transit service to Marin County is provided by the Golden Gate Transit buses (on Howard and Folsom Streets) and by SamTrans buses serving San Mateo County (on Mission Street).

Independently franchised jitneys (12-15 passengers per vehicle) serve the YBC from the Outer Mission District, along Mission Street and the S.P. Depot along Third and Fourth Streets.

Indirect service includes the Alameda-Contra Costa Transit District (A-C Transit), serving cities in Alameda and Contra Costa Counties, the Southern Pacific R.R. (SPRR), serving cities in San Mateo and Santa Clara Counties, and the Golden Gate Ferry system, serving cities in Marin County.

Transit capacities have been determined for each agency serving the project area. The capacities are shown in the opposite table for existing equipment and scheduled headways. Headway is the average time between transit vehicles at a checkpoint on a scheduled route.

An inventory of transit patronage in the vicinity of the project area is presented in the following table, covering two time periods and a breakdown for inbound and outbound trips. MUNI carries the largest passenger load in the YBC area.

All data for existing transit capacities and passenger volumes on the two tables are from publicly available system reports, as follows:

> San Francisco Municipal Railway: T. Standing and G. Cauthen (Muni POM Study, 1977); Southern Pacific Railroad: Discussions with G. Pera and E. Mohr (Metropolitan Transportation Commission) (7/21/77); SamTrans: A. Lumley (Schedules, plus discussion 7/21/77); Golden Gate Transit: B. Richard (Schedules, plus discussion 7/26/77); Harbor Carriers, Inc.: Dispatcher's office (discussion 8/11/77); BART: W. Belding (discussion 7/21/77); A-C Transit: R. Videll (discussions 7/21/77, plus "Traffic Survey Series A-48" (Institute of Transportation Studies, April, 1977).

EXISTING TRANSIT PASSENGER VOLUMES

EXISTING TRANSIT PASSENGER VOLUMES
VICINITY OF YERBA BUENA CENTER

TRANSIT AGENCY		WEEKDAY PASSENGER VOLUMES				
		P.M. Peak 4-6 P.M.*		Night 7-8 P.M.		Date of Survey
		In	Out	In	Out	
S. F. Municipal Railway: Routes J,K,L,M,N,5,6,7,8, 9,11,12,14,15,17,21,25,27,30,31,33,38,40/80,41,59 60,66,71,72		10,200	26,500	1,410	3,810	Months of April/May 1975
Southern Pacific Railroad		-0-	6,190	-0-	-0-	Tues.-Wed. Oct. 12-13, 1976
SamTrans		270	350	160	10	Month of July, 1977
Golden Gate Transit:						
Buses						
First Street Routes 2,4,6,8,10,18,22,24,26,34, 36,40,52,54,64,74,76,78		140	6,270	-0-	-0-	
Folsom-Howard Routes 20,30,50,62,70,80		350	850	70	130	Month of
Ferries: Larkspur, Sausalito		510	1,400	100	630	May, 1977
Harbor Carriers, Inc.						Thursday
Tiburon Ferry		20	450	10	50	July 21, 1977
BART:						
Transbay	Montgomery	390	4,630	70	550	Wednesday
(To/from E. Bay and	Powell	560	1,660	160	480	May 11, 1977
Westbay	Montgomery	100	4,110	50	180	
(To/from Daly City Direction)	Powell	380	1,860	120	320	
A.C. Transit: Routes A,B,C,E,F,G,H,K,L,N,O,R,S,V, V,W,Y**		1,430	11,650	150	450	Thursday April 21, 1977

WEEKDAY TRAFFIC VOLUME SUMMARY
1976 DATA

STREET		TIME PERIODS			
		24-hour	4-6 p.m.	4:30 p.m. to 5:30 p.m.	7-8 p.m.
First*	S/B**	11,600	2,100	1,100	400
Second*	S/B	1,700	200	100	100
	N/B	2,100	300	200	100
	TOTAL	3,800	500	300	200
New Montgomery	S/B	8,700	1,400	800	300
Hawthorne	S/B	3,000	500	300	100
Third*	N/B	19,500	3,100	1,700	600
Fourth	S/B	13,000	2,500	1,300	400
Fifth*	S/B	7,200	1,000	500	300
	N/B	7,500	1,200	800	300
	TOTAL	14,700	2,200	1,300	600
Sixth*	S/B	10,700	1,700	900	400
	N/B	7,900	1,200	600	300
	TOTAL	18,600	2,900	1,500	700
Market	TOTAL	10,300	1,800	1,000	400
Mission*	E/B	8,500	1,400	700	200
	W/B	9,900	2,000	1,100	300
	TOTAL	18,400	3,400	1,800	500
Howard*	W/B	16,100	4,500	2,600	300
Folsom*	E/B	13,600	2,100	1,400	200
Harrison***	W/B	7,900	1,800	1,100	100
James Lick*	TOTAL	172,000	20,400	15,200	7,000
Bryant***	E/B	7,200	1,100	700	100

*Machine count data available. James Lick data from CALTRANS.
**S/B=Southbound, etc.
***1971 machine count data.

The jitneys supplement public transit. A sample 1977 study[4] on Mission Street showed 435 passengers in 35 jitneys outbound from 4:30 - 5:30 p.m. Inbound flow was 162 passengers in 26 jitneys. There are 116 approved permits[5] for jitney operations on Mission Street and five for operations on Third/Fourth Streets.

Muni carries the largest passenger load in the YBC area.

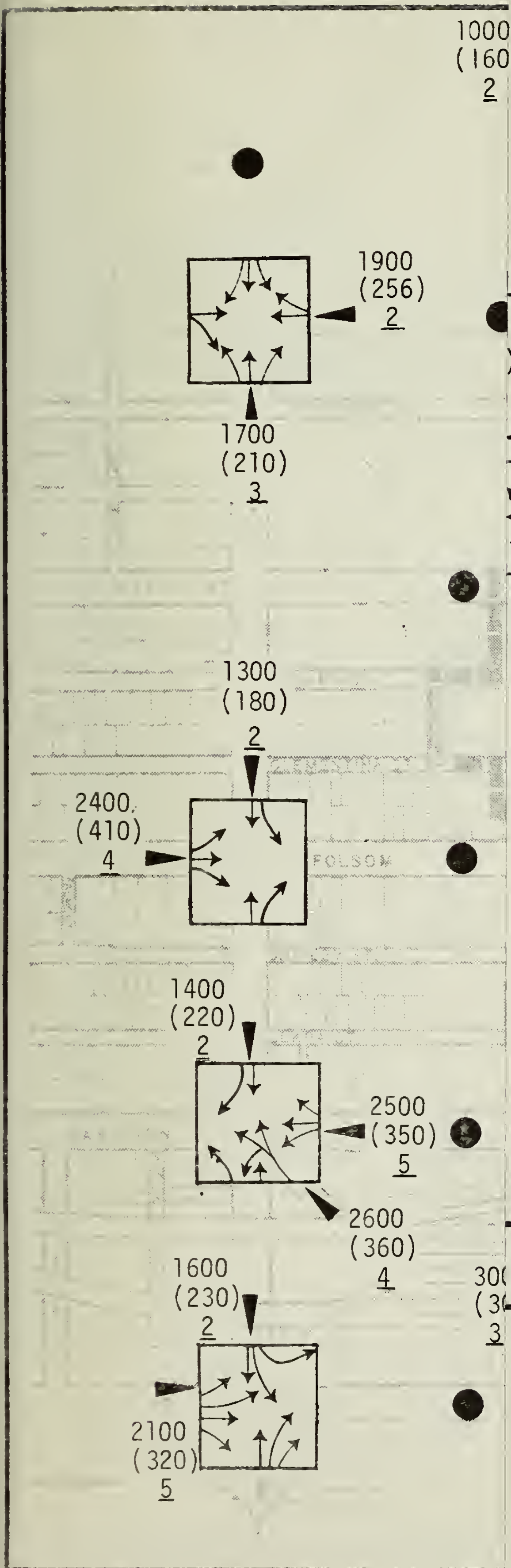
Mixed Vehicles. The traffic volumes in the area are based on the available machine count information from the San Francisco Department of Public works, Traffic Engineering Division. Where machine counts were not available, estimates were made by expansion of available intersection turning movement counts. The volumes are shown in the opposite table with a breakdown for four different time periods.

The traffic volumes range from about 3,000 vehicles per day, on Hawthorne Street, to about 19,500 vehicles per day on Third Street. Fifth, Sixth, Mission and Howard Streets carry volumes of traffic near the upper end of the range. The evening peak represents the peak weekday period of traffic flow.

Manual turning movement counts were obtained for the morning, midday, and evening peak periods at 14 intersections in and adjacent to YBC. The locations of the turning movement counts are shown in the following figure, with the total approach volumes for the peak hours and the number of lanes available. The approach volumes were translated (assigned) to adjacent intersections to provide volume estimates at those intersections not counted. This figure also shows the locations of the machine counts reported in the Table.

The suceeding figure on headways is included to show an area-wide indication of level of traffic service. This figure shows the average headways (time between vehicles entering an intersection) for the intersection approaches with the highest average volumes per lane in the evening peak period, and for some intersections where the highest volumes occur during the morning peak.

Level of Service "D" as defined in the Highway Capacity Manual[6] is used for evaluation of YBC traffic flow conditions. The following Table shows the definitions of all Levels of Service.

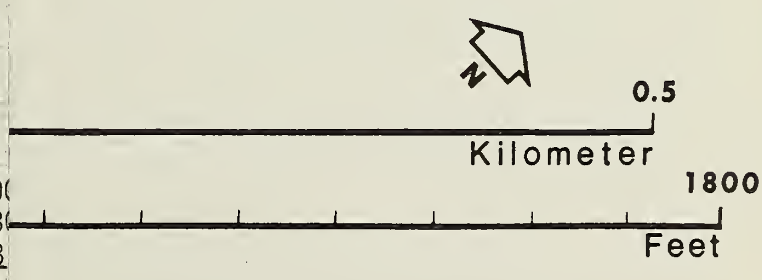


Approach volume 4-6 P.M. (1977)
Approach volume peak 15-minutes (1977)
Traffic lanes

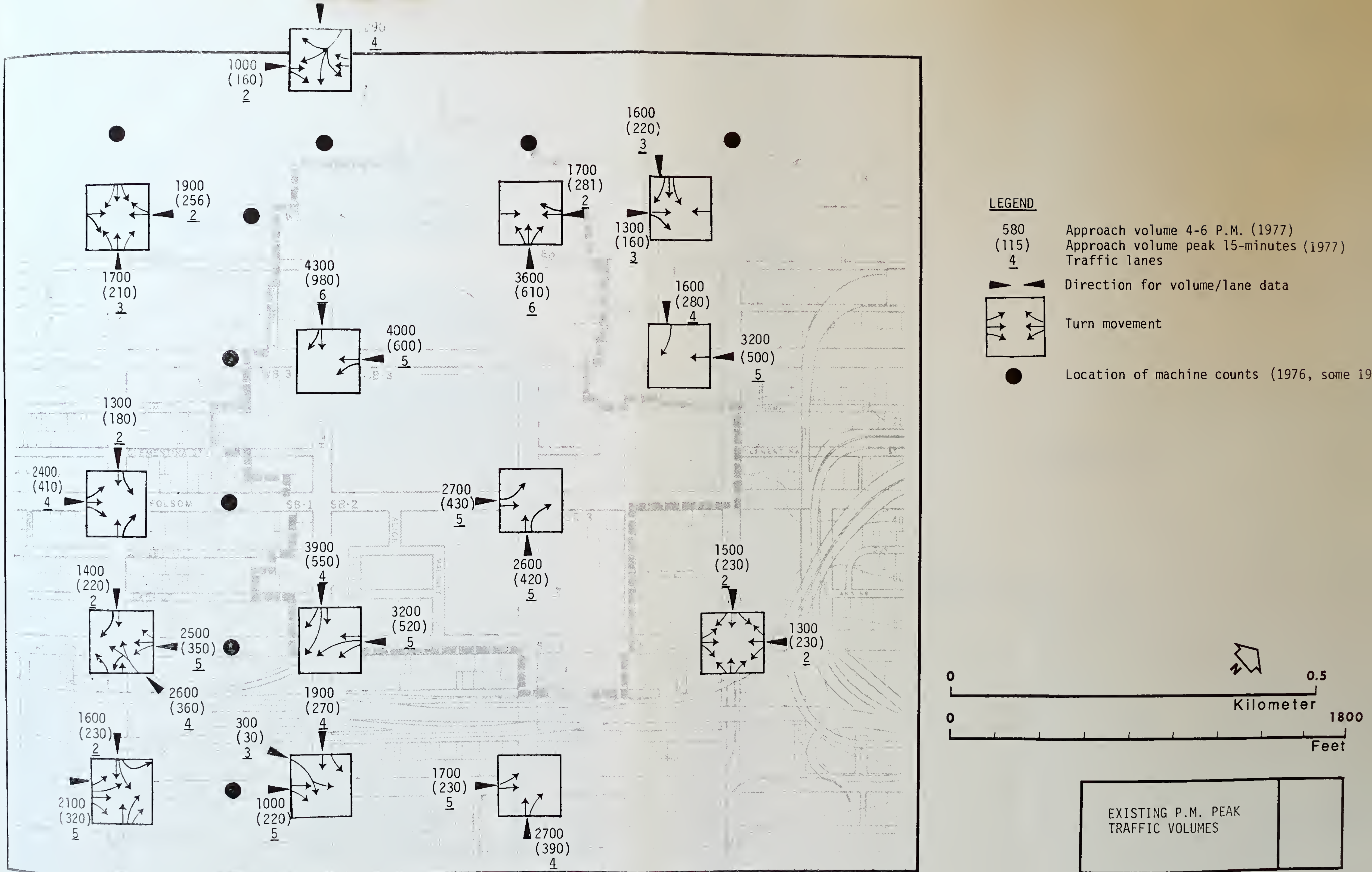
Direction for volume/lane data

Turn movement

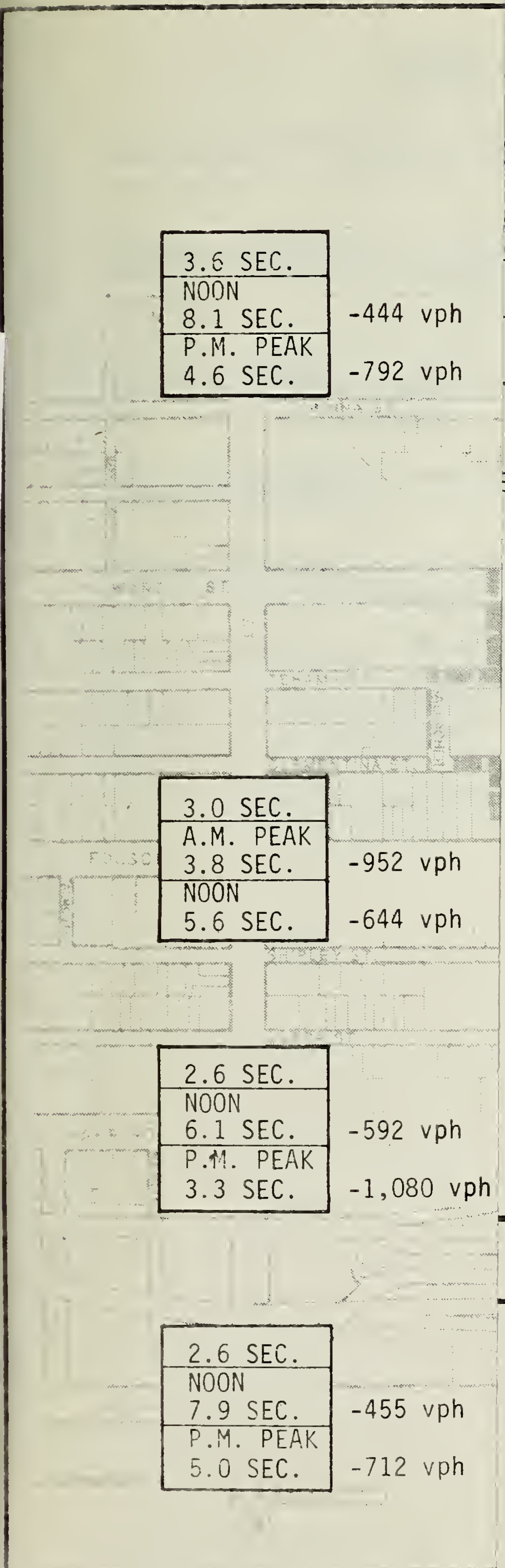
Location of machine counts (1976, some 1971



EXISTING P.M. PEAK
TRAFFIC VOLUMES



EXISTING P.M. PEAK TRAFFIC VOLUMES

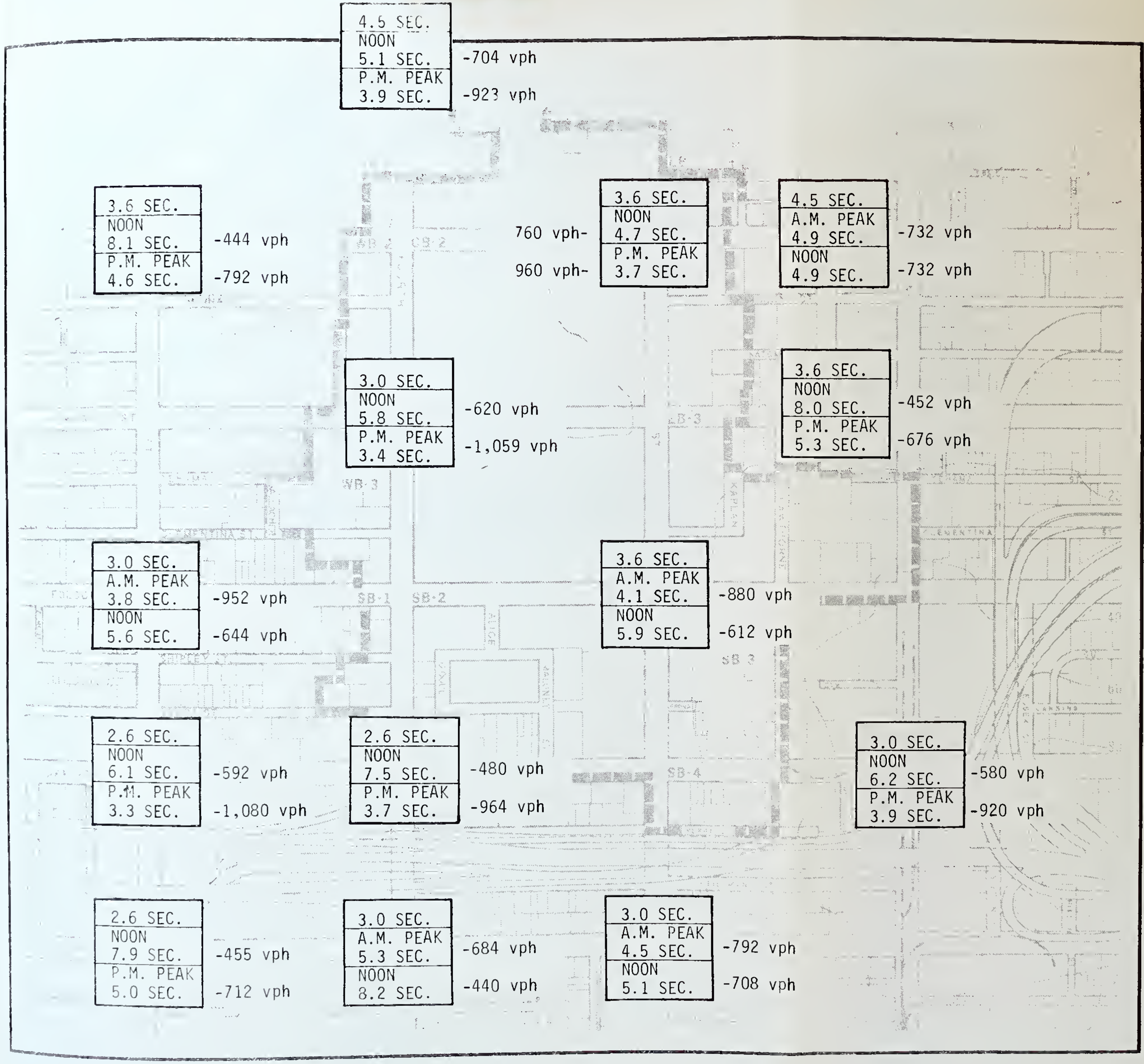


ND

SEC.	Guideline Headway Level of Service "D"
SEC. PEAK SEC.	Existing headways for noon hour and peak 15 minutes in P.M. peak hour.
30 vph	Existing equivalent hourly critical approach lane volumes in vehicles per hour.
Note -	The critical approach lane volume is the total of the highest-volume conflicting movements at an intersection. (See Appendix F for sample calculation)

0.5
Kilometer
1800
Feet

EXISTING PEAK VOLUMES AND VEHICLE HEADWAYS



LEGEND

3.0 SEC. / NOON 8.1 SEC. / P.M. PEAK 5.3 SEC. — Guideline Headway Level of Service "D"

Existing headways for noon hour and peak 15 minutes in P.M. peak hour.

\- 580 vph — Existing equivalent hourly critical approach lane volumes in vehicles per hour.

Note - The critical approach lane volume is the total of the highest-volume conflicting movements at an intersection. (See Appendix F for sample calculation)

0 — 0.5 Kilometer

0 — 1800 Feet

EXISTING PEAK VOLUMES AND VEHICLE HEADWAYS

LEVEL OF SERVICE DESCRIPTIONS

Level of Service A - Conditions are such that no approach phase is fully utilized by traffic and no vehicle waits through more than one red indication.

Level of Service B - An occasional approach phase is fully utilized; vehicle platoons are formed; this is suitable operation for rural design purposes.

Level of Service C - Stable operation; occasionally, drivers may have to wait through more than one red indication; this is suitable operation for urban design purposes.

Level of Service D - Approaching unstable operation; queues develop, but are quickly cleared.

Level of Service E - Unstable operation; the intersection has reached capacity; this condition is not uncommon in peak hours.

Level of Service F - Forced flow; intersection operates below capacity.

"High" Levels of Service (A, B, B-C) are termed "good"; "moderate" Levels (C, C-D) are termed "fair"; and "low" Levels (E, F) are termed "poor."

EXISTING PEAK HOUR HEADWAY SUMMARY
BASED ON 15-MINUTE VOLUMES

		GUIDE HEADWAY	ACTUAL HEADWAY	HOURLY VOLUME	CAPACITY*	% OF CAPACITY (100 V/C)
FIFTH	MISSION	3.6	4.6	792	1,000	79
	FOLSOM	3.0	5.6	644	1,200	54
	HARRISON	2.6	3.3	1,080	1,400	77
	BRYANT	2.6	5.0	712	1,400	51
FOURTH	MARKET	4.5	3.9	923	800	115
	HOWARD	3.0	3.2	1,128	1,200	94
	HARRISON	2.6	3.7	964	1,400	69
	BRYANT	3.0	8.2	440	1,200	37
THIRD	MISSION	3.6	3.7	960	1,000	96
	FOLSOM	3.6	6.4	562	1,200	56
	BRYANT	3.0	5.1	708	1,200	59
NEW MONTGOMERY	MISSION	4.5	4.9	732	800	92
	HOWARD	3.6	5.3	676	1,000	68
SECOND	HARRISON	3.0	3.9	920	1,200	77

*Level of Service "D." See opposite Table.

VEHICULAR LEVEL-OF-SERVICE GUIDELINES
FOR VARIOUS PEDESTRIAN VOLUME LEVELS
LEVEL OF SERVICE D

PEDESTRIAN VOLUME	MAXIMUM VEHICLE VOLUME CRITICAL APPROACHES TOTAL VEHICLES PER LANE	MINIMUM VEHICLE HEADWAY (SECONDS)
Light*	1,400	2.6
Moderate	1,200	3.0
Moderately High	1,000	3.6
Very High	800	4.5

*See definitions in Appendix M.

The opposite Table shows the existing headways at selected intersections, with the guideline headways and a Volume/Capacity percent (100 V/C) for Level "D." Since all actual headways but one exceed guideline headways (all streets but one are below 100% of Level "D" "capacity"), Level of Service almost everywhere is at "D" or better. Fourth at Howard Street, Third at Mission, and New Montgomery at Mission are close to capacity (92-96%). Fourth at Market is over capacity (115%).

According to a 1974 Department of Public Works study, traffic accidents for the project area are higher than for the City as a whole, as shown in the Table below[7]. This is due to the higher volume of mixed-vehicle, transit and pedestrian activity in YBC than in residential neighborhoods.

TRAFFIC ACCIDENT RATE[7]
ACCIDENTS PER MILLION VEHICLES,* 1969-1973 Period

INTERSECTION TYPE	AVERAGE ACCIDENT RATES CITY-WIDE	YBC AREA
Two-way streets	0.37	0.51
One-way streets	0.39	0.76
One-way & two-way streets	0.53	0.70
One-way & two-way "I" intersections	0.08	0.13

*One million vehicles would pass through the busiest YBC intersection, Third at Mission, in about one month.

Truck Traffic. The movement of goods in commercial vehicles within the project area is vital to the conduct of business. Although the trucks in the traffic stream are fewer than 3% of the total number of mixed vehicles, the overall effect of truck traffic can be increased.

A 1973 study[8] of truck traffic in the downtown area showed that industrial buildings and warehouses in the downtown area generate about 65 truck trips daily per hundred thousand square feet of floor space, compared with 22 and 26 trips by retail and office buildings, respectively.

Currently, the older commercial and industrial establishments provide inadequate loading facilities for trucks, having been built before relevant code requirements came into force in 1968. The resulting disruption due to double parking of trucks and to their maneuvers into and out of narrow alleys is compounded by other illegal parking.

Other Traffic. There are other modes of travel in the project area. These include taxis, charter buses, limousines and bicycles. Their contribution in serving YBC has not been quantified.

Parking

Within the YBC boundaries, a current parking inventory[9] shows a total of 5,800 spaces. An early-afternoon study[10] showed that 5,400 vehicles were using the off-street spaces. This represents 93% occupancy, a "full" condition. (For off-street parking spaces a rule of thumb used by traffic engineers is that 85% occupancy represents "full" occupancy. The remaining spaces are in the process of being-- or about to be-- occupied by arriving vehicles).

Observations outside the YBC boundaries show that on-street spaces are used to capacity and that the off-street spaces drop in occupancy with incresing distance away from the retail core along Market Street.

Environmental Impacts

This following discussion deals with the impacts of the proposed YBC activities on the available transportation system. The analysis is based on travel generated by the full YBC development as superimposed on the downtown peak hour transportation demands. For special events, other times are also discussed. Consideration has been given to parking demand and supply for the existing condition. For greater detail (particularly as to methods of analysis and intermediate calculations) than is presented in this section, see Appendix M.

Trip generation rates were applied to the alternative land use designations to produce estimates of person tripends for a representative weekday and a representative Saturday. Trip-ends represent the travel associated with any particular land use. The arrival of a person at a location and his subsequent departure represent a total of two person trip-ends for the one "trip." These trips were then assigned to a conveyence or "mode" in order to determine travel. The principal modes of travel would be walking, transit, and automobile. Other modes include service and delivery vehicles, taxis, and jitneys.

Travel generated for the YBC was distributed throughout San Francisco and the region. Such travel distributions are heavily influenced by trip purpose time of day and day of week. A major impact on the transportation facilities in the project area are pedestrians.

Pedestrian travel would include: (a) travel from YBC residential units to functions within the area and to transit lines; (b) worker and visitor travel from YBC to the downtown hotels, shopping, other offices, automobile parking, the Southern Pacific Railway, BART and the Trans-Bay Terminal; and (c) shorter pedestrian trips (workers and visitors) to Muni, Golden Gate Transit, SamTrans or jitneys. Pedestrian concerns include vehicle loading and unloading, pedestrian waiting areas at bus stops, flows along the principal sidewalks and walkways connecting principal YBC traffic generators, and safety at intersections.

The amount of travel for service and delivery vehicles in the area based on the latest survey amounts to about 3% of the vehicle travel in the downtown area[11] and is expected to remain at about the same percentage.

Parking within the area includes that defined for public parking and that estimated for private parking as it may be developed in accordance with the Department of City Planning Master Plan policies and the requirements of the Planning Code.

The transportation impact analysis is based primarily on the impact of the YBC activities together with the existing and projected peak hour travel on the capacity of the street network. The impact threshold is assumed to be reached when a facility is unable to operate at a level of Service "D," as discussed above under "Environmental Setting."

Total Travel

For general comparison, the Table below shows the travel generated by YBC for 1988, compared to the existing generation. Since, as can be seen, the existing (base) traffic is also heaviest during the weekday peak, the analysis of congestion can be limited to that period, except for special events.

TABLE OVERALL YBC TRAVEL PROJECTIONS - Person Trip-Ends

TIME	EXISTING	1988
Weekday (24-hr)	24,600	208,800
Weekday Peak Hour (4:30 - 5:30 P.M.)	2,200	18,800
Nighttime (7:00 - 8;00 P.M.)	400	12,600
Saturday (3:00 - 4:00 P.M.)	800	9,800

TRANSPORTATION MODES

Pedestrians. Pedestrian movements external to the YBC area would be those to the Montgomery and Powell BART stations, the Hotel, Retail, and Financial Districts, the Transbay Terminal for access to A-C Transit, and the Fremont and Mission Street area for access to the Golden Gate Transit bus routes. In addition, there would be a movement to the Southern Pacific Railway Terminal. Pedestrian movements north of Market Street are not considered to be impacted by YBC due to the branching possibilities for pedestrian flows along the individual streets north of Market. The YBC peak pedestrian volumes would be northerly to BART and Market Street; they would occur at the same time that Third and Fourth Street sidewalks are occupied with pedestrians from outside uses. The result would be restricted walking speeds with a high probability of conflicts[2]. People waiting for buses could block 10-15 feet of sidewalk, or more. Volumes of up to 2200 pedestrians in a 15-minute period could be realized on the Market to Mission section of Fourth Street in 1988. These volume of movement assume a convention with maximum attendance (24,000 persons).

Should a special event such as a rock concert be held in the convention center, there could be a higher peak pedestrian demand on the adjacent sidewalk system. This could add up to 10,000 pedestrians in a 15-minute period to the sidewalks along Howard Street. The resulting pedestrian flow would be greatest on the south side of Howard Street toward Third and Fourth Streets. The resulting flow rate of 23 pedestrians/foot/minute would be exceeding the capacity (Level "D") of the adjacent sidewalks.

Transit. The transit impact analysis was done at check points around YBC for Muni, SamTrans and Golden Gate routes passing through the YBC area. Appropriate stations or terminals were analyzed for the other transit modes: BART, A-C Transit, and Southern Pacific Railway. The jitney service on Mission Street and to the Southern Pacific station was not analyzed quantitatively as it represents less than 1% of YBC travel. Further, since they presently operate at capacity during the peak hour their ability to absorb additional ridership is nil.[13]

The Muni serves practically every block in the YBC area with a network of motor coach, trolley coach, streetcar or cable car lines. Muni Metro will be adding to the streetcar capacity by 1979 to the extent that the two-hour p.m. peak capacity will be approximately doubled.[14]

To analyze the impacts of YBC the existing patronage on Muni and the predicted additional demand were added to obtain total expected loading on the system. The loading was then compared with the capacity of the Muni lines at several external check points. The results are in the form of a demand/capacity ratio (expressed as a percentage) for the 4-6 p.m. peak period are shown in the following Tables for each check point. P.M. peak patronage data were available for only the peak two-hour period. As can be seen from the two tables, the demand/capacity ratio would exceed 100% for the Geary Street and Second Street lines outbound, and for the Powell Street cable car, both inbound and outbound. On other routes, there is currently excess peak period capacity to handle additional downstream demand (averaged over two hours). However, for the peak hour or half-hour, observations indicate that the Muni lines are at capacity today on most routes.

MUNICIPAL RAILWAY DEMAND/CAPACITY RATIOS (%)
FOR THE P.M. PEAK (4-6 P.M., Outbound)*

CHECK POINT	DEMAND/CAPACITY RATIOS (%) Existing	Future 1988
Market (east)	14	17
Market (west)	44	56
Mission (east	18	29
Mission/Howard (west)	50	62
Folsom	3	7
Kearny	57	71
Geary	89	124
Second	71	102
Fourth	31	36
Fifth (south)	30	37
Fifth Extension (north)	23	83
Harrison	50	71
Powell	125	158

*The 4-6 p.m. 2-hour period is the standard time interval for p.m. peak ridership survey data collection. In the peak hour or peak half-hour, most of these lines are at capacity.

MUNICIPAL RAILWAY DEMAND/CAPACITY RATIOS (%)
FOR THE P.M. PEAK (4-6 P.M., INBOUND)*

CHECK POINT	DEMAND/CAPACITY RATIOS (%) Existing	Future 1988
Market (east)	10	11
Market (west)	55	58
Mission (east)	37	39
Mission/Howard (west)	17	21
Folsom	3	4
Kearny**	53	58
Geary	24	33
Second	29	35
Fifth Extension (north)	18	33
Harrison	30	36
Powell	154	163

*See footnote, Table opposite.
**Kearny Street is one-way northbound. The inbound Kearny Street lines return on First Street (Lines 15/42) or on Fourth Street (Lines 30/30X).

While it is recognized that Muni Metro will increase Muni's system capacity the demand/capacity analysis has been based on an assumed constant (non-YBC) patronage and equipment supply condition.[15]

For the 4-6 p.m. peak period there are several observations relative to the impact of YBC on Muni. Scheduled headways are often not realized, with a resulting degradation of service. General observations (outbound transit) for the potential problem check points are discussed below:

- Geary Street transit lines (westbound) would be over capacity by 1988.

- By 1988, Second Street to the south would be near or over capacity, with demand/capacity ratios of up to 102%.

- Other principal check points such as Market (westbound) and Mission/Howard (westbound) would be estimated to be at 46-62% of capacity by 1988. For the Muni lines crossing these check points, some might be at capacity while others might be under capacity. The downstream additions would add to capacity problems on some lines. With several lines at or exceeding capacity, some patrons could be expected to seek alternate Muni routes (perhaps with a transfer required) to reach their destinations.

- The data for the check points for Market (eastbound) and Mission (eastbound) are based on an assumption that the existing patronage east of the project is the same as the existing patronage between Fifth and Sixth Streets for eastbound vehicles. This means that the inbound p.m. peak Muni demand/capacity ratio generally is low and travelers in the off-peak directions would have adequate space.

Additional Muni nighttime patronage would present no load problems, because of available capacity after the peak. Localized impacts could occur in the vicinity of the convention center, for special events, with sidewalk blockage at transit loading locations.

The existing demand/capacity ratios for Southern Pacific Railroad, SamTrans, Golden Gate Transit, BART, A-C Transit, and Harbor Carriers, Inc. show ample capacity during the p.m. peak two-hour period. SamTrans and A-C Transit (outbound) have the least excess capacity with demand equaling 67 and 66 percent of capacity for the two facilities respectively. Peak half-hour demand does show overloadings for some agencies. As an example 1977 data for BART show that the peak 5-minute demand/capacity ratio for transbay p.m. peak travel is 180% of seated capacity.[16] The other transit agencies have similar peaking characteristics, but usually not to the same extent.

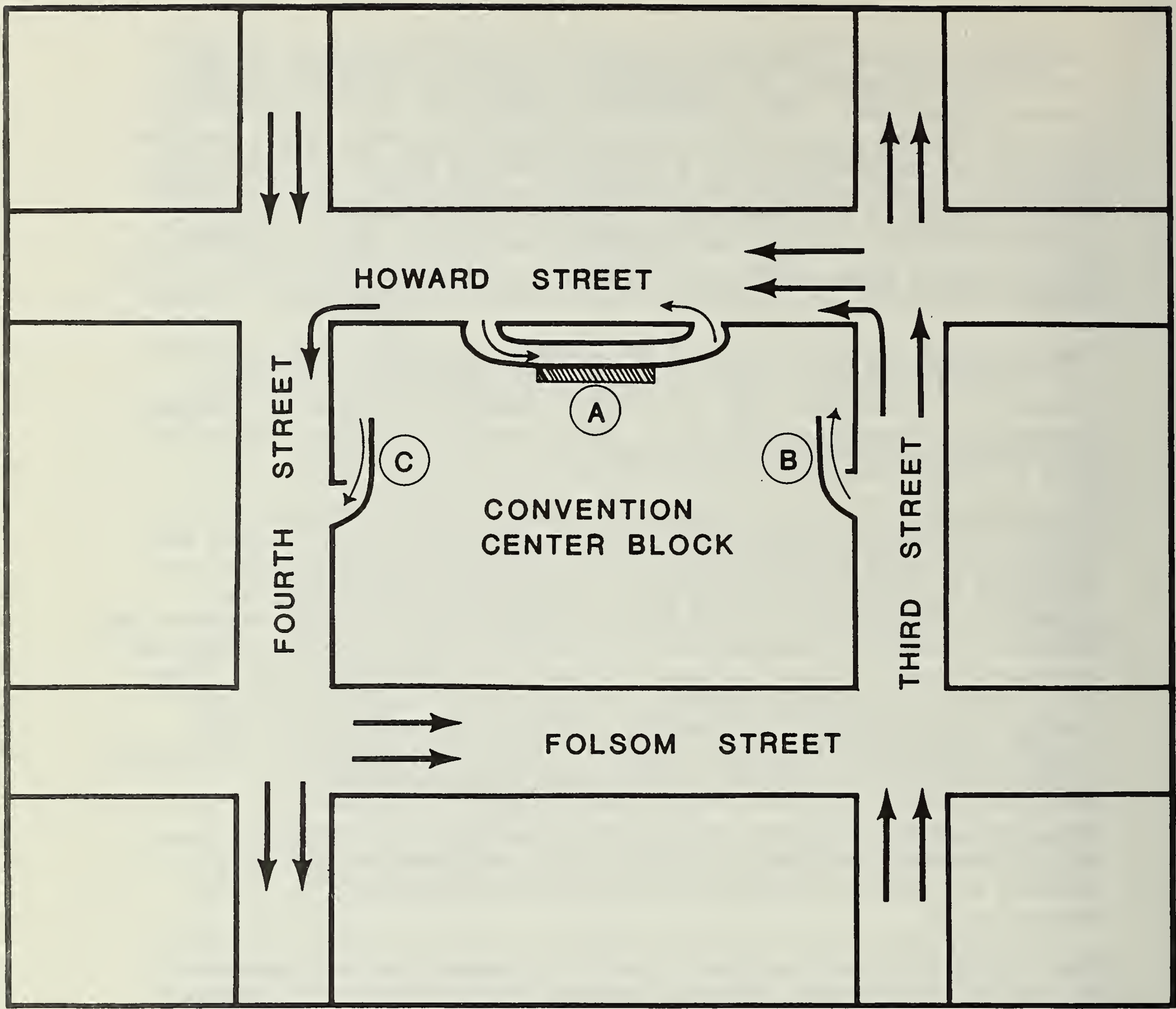
With the exception of SamTrans the impact of the YBC oriented transit patronage will be minor on the demand/capacity ratios of the external transit operations. Part of the SamTrans overload can be attributed to the fact that as in the Muni analysis, equipment numbers remain constant through the forecast period. A second factor is that all new Pininsula-bound bus travel generated by the project was assigned to US 101 rather than a portion to the shared BART/SamTRans/I-280 assignment using the Daly City BART Station.[17] As SamTrans is the newest agency operating in the YBC impact area (service initiated July, 1977), schedule and equipment changes responding to future patronage levels may be expected to occur.

The potential nighttime loadings for transit with night service to YBC are not large enough to present problems with respect to available capacity. Calculations show the current nighttime loadings on SamTrans, Golden Gate Transit and BART to be 40% of capacity or less. Projected 1988 demands would not approach capacity.

Mixed Vehicles. The mixed-vehicle analysis is based on assignment of traffic to the seven geographical areas used in this study: North Bay; Peninsula; East Bay; Downtown/Northeast; and Northwest, Southwest, and Southeast San Francisco. Traffic was assigned over several routes within San Francisco. For the impact analysis there are ten intersections within and near YBC through which most of this traffic passes, where the greatest potential effect on level of service would be expected. These were used for the impact analysis. The projected impacts on the ten intersections represent the maximum that could be expected for 1988. There would also be localized impacts at points of entry to the principal streets (Mission, Third, etc.) from parking garages and lots.

Assumptions were made that the principal parking would be that adjacent to the southerly YBC limits in the vicinity of Harrison and Bryant Streets and that any long-term increases in parking would be in this general area.

The ten intersections analyzed cover the principal one-way streets in the YBC area and access points to the James Lick Freeway and the Bay Bridge. From this analysis it was found that the Fourth and Market Streets intersection has reached capacity. Introduction of the YBC generated traffic begins to compound the problem such that more of the ten analyzed intersections experience capacity problems. By 1988 all except the peripheral intersections with Bryant Street will experience moderate to severe capacity problems. The net effect would be a spreading of the peak time later in the period. The chief effect of degraded vehicular Levels of Service is that vehicles have to wait for several signal changes to clear intersections, and that long queues form. Pedestrians are unaffected unless vehicles block crosswalks.



Sketch: Not to Scale

LEGEND

- (A) Passenger arrival/departure area (at Howard Street level)
- (B) Truck entrance ramp down to underground unloading area (at Exhibit Hall level)
- (C) Truck exit ramp up from underground unloading area (at Exhibit Hall level)

CONVENTION CENTER ACCESS

The convention center is proposed to have an internal passenger arrival/ departure area on the south side of Howard Street (a one-way westbound street), midblock between Third and Fourth Streets. (See Figure opposite). Autos, taxis and charter buses would arrive in the southermost of the Howard Street lanes, pass the exit point, and then turn into the entry area. (They would make a 180° turn so that the right side of the vehicle would face the convention center entrance). Conflicts could occur, especially during a convention adjournment in the p.m. peak 15 minutes, when the intersection of Fourth and Howard Streets would be operating at about Level of Service "E" in 1988, with potential backups in all Howard Street lanes. The coincidence of this conflict is not expected as a usual or daily occurance.

Localized truck activity associated with the convention center would be accommodated by an underground loading dock. The proposed design[18] incorporates nine bays for trucks up to 62 feet in length and three bays for shorter trucks. Access to the underground loading area would be via a ramp fronting on Third Street between Howard Street and Folsom Street. Trucks would depart via a similar ramp on Fourth Street between Howard and Folsom Streets.

The heaviest amounts of convention center truck activity would occur during the set-up and take-down periods before and after a convention. Because of the need for emergency access to the convention center excess trucks waiting to be loaded or unloaded cannot be stored on the entry ramp. Accordingly, trucks waiting to enter the loading area could cause limited congestion on Third and Folsom Streets depending upon the time of day (peak-hour or off-peak) the need for truck storage occurs.

Trucks. The mix of service and delivery vehicles would consist of light, medium, and heavy trucks. A number of these vehicles are relatively small and have been included in the impact analysis for mixed vehicles discussed previously. The more-specific impact of commercial-vehicle activity would be potential congestion at the actual loading points if access and truck storage area at loading docks were inadequate.

It is anticipated that the service and delivery activity would follow the same patterns identified in the Downtown Parking and Traffic Survey.[11] It can be expected that most of the commercial vehicle arrivals would occur in the morning hours and reach a peak accumulation (storage of vehicles on-site) during the late morning.

Other Traffic. Other traffic (taxis and jitneys) is included in the mixed-vehicle analysis as part of the regular traffic stream. For special events at the convention center there could be 100 taxi trips and 10-20 charter buses per hour serving an event. The effect of these operations on the traffic stream will be minimized by use of the convention center internal passenger loading area. Some backups on Howard Street can, however, be expected during a peak 15-minute period prior to or after a convention center activity.

In the transit analysis, the jitney service currently running along Mission Street has not been allocated any YBC patrons. It is available for service and is currently running near capacity in the YBC area in the p.m. peak hour, and at capacity at some downstream points during that peak.

Parking Characteristics.

The Table below shows the parking space supply, the parking demand generated for the daytime hours, and the resulting parking space deficiency. The parking demand has been generated from the total estimated travel by auto to the YBC area with vehicle-occupancy, daytime-proportion-of-trips, and parking-space-turnover factors applied.

PARKING SUPPLY AND DEMAND
NUMBER OF SPACES IN PROJECT AREA

	EXISTING		FUTURE**** 1988
Supply*	5,800	On-Street:	800+
		5th & Mission:	280
		Other Public:	1,260
		Private:	3,085
		TOTAL (Rounded)	5,400
Demand	5,410**	YBC uses only:	10,200
Deficiency	FULL***	YBC uses only:	4,800

*On and off-street.
**Observed usage, July 1977, weekday afternoon, between 1 and 4 p.m., December demand would be expected to be higher.
***Actual existing demand could be higher than shown, since the area is "full" (greater than 85% occupancy). About 15% of the spaces are represented by autos in the process of parking or unparking
+Approximate.
****The development of 900 units of housing would result in a reduction of the parking space deficiency by 5,000 parking spaces.

The final parking supply and demand would depend upon the facilities actually constructed in YBC, i.e., if office and commercial space is replaced by other uses or if the estimated private parking supply does not materialize the currently estimated deficiency could change substantially.

New YBC developments would be replacing public and private parking in some cases. The parking deficiency would be aggravated because persons (most of whose destinations are outside YBC) now using the existing supply of 5,800 spaces in the YBC area would, for the most part, have to park elsewhere. The displaced autos would disperse into the surrounding area in search of parking spaces. Another possibility is a diversion of some people from the auto to Muni and other available transit.

Construction Activity.

Project construction activities would displace parking from the area, and construction workers would increase demand for parking. Part of the worker-parking demand could be satisfied on-site during a portion of the construction period. However, there would be added demand which would shift to beyond the southerly project limits for walking distances up to 1,000 feet.[19]

Another impact associated with construction would come from trucks removing spoils and bringing in construction materials. During the estimated five months of excavation for the convention center, up to 80 haul trucks (160 trip-ends) per hour could move in and out of YBC. Depending on the intensity of development at any other time, there could be approximately 700-800 truck movements per day to and from the construction sites at a rate of up to 120 trip-ends per hour. The predominant truck flows will concentrate on Third, Fourth, Howard, and Folsom Streets during construction of the convention center.

The construction managers for the convention center have proposed a system of barriers during construction. On the CB-3 borders, they would close 8-foot-wide lanes on Third, Fourth and Folsom Streets, and a 4-to-6-foot-wide lane on Howard Street, for up to two years (24 hours a day). Temporary barriers (9 a.m. -4 p.m.) would obstruct an additional lane on each street, outside of the peak hours.

Since, with the exception of portions of Third and Howard Streets the areas to be barricaded are presently on-street parking lanes, there would be minimal effect on the physical capacity of the streets bordering CB-3. It can be expected however that traffic will not move through such an area in normal flow patterns and congestion and abnormal delays will occur. The potential for such delays will depend largely on the construction activity underway at any particular time and how close to a peak-hour the activity occurred.

Permitted Uses

The impacts provoiusly discussed in this section were based on the designated uses as described in Part IV. The permitted variations to the designated uses will be addressed in terms of the effects the permitted uses will have on the impacts previously presented. Briefly,

the permitted uses analyzed include: (1) Hotel in EB-1 rather than CB-2, (2) 1250-space parking garage in EB-3 rather than Office and Retail, and (3) up to 900 additional dwelling units spaced fairly uniformly around the YBC rather than office, retail, light industrial and a parking structure.

The change in location of the hotel would cause no change in the loading on the transportation systems serving YBC. Were the 900 dwelling units to replace a considerable portion of the retail/commercial/industrial space trip-ends to YBC would be reduced by an estimated 20,000 per 24-hour period. Assuming only a modest 50/50 auto/transit split there would be a significant impact on the number of autos in the area and on the parking deficiency noted for the designated uses. The loss of 760 spaces in SB-3 would be more than offset by the decrease in parking demand.

Construction of the 1250-space garage in EB-3 would eliminate roughly 3000 trip ends per day again lessening the demand for parking while increasing supply. This increase in supply would also help increase the need to "cruise" the YBC area looking for a parking space.

Were all the "permitted uses" implemented, the parking deficiency of 4,800 for YBC new demands noted previously under the designated-uses impact discussion would be resolved. This result would come about because the net traffic generation by 900 housing units (instead of industrial/office developments) results in 5,000 less parking spaces. The congestion on the main arterial (Market, Mission, Howard, Third, Fourth, and Fifth Streets) would still exist but would occur less often and over short time periods. Overall transit usage would be effected but mainly through less peaking, not in total vehicle demand. Night and weekend impacts were not considered to be significantly altered.

<u>Mitigation</u>

It can be recognized from the transportation impacts discussion that mitigation measures must be instituted to eliminate or reduce the impacts of pedestrians, automobiles, transit, and construction brought about by development of YBC. Mitigation measures must therefore involve pedestrians, transit, intersections, construction activities and parking.

Transportation impacts are developed by (1) the pedestrian and vehicular traffic generated by the Project and (2) by pedestrian and vehicular traffic generated elsewhere but passing by or through the Project. Similarly, the mitigation needs are within control of diverse interests. The Local Public Agencies include the SamTrans, San Francisco City and County Planning Department, Public Utilities Commission, Public Works Department (including the Traffic Engineer), Municipal Railway, and the Redevelopment Agency. State and federal agencies include: CalTrans, Bay Area Air Pollution Control District, Health Department, Environmental Protection Agency, Department of Health, Education and Welfare,

Department of Transportation (Federal Highway Administration, and Urban Mass Transportation), and the Department of Housing and Urban Development. Private individuals and organizations concerned with traffic include the Chamber of Commerce, Southern Pacific Railroad Company, various merchant organizations, automobile clubs and insurance companies, building management persons, company personnel officers.

The mitigation measures discussed seek to bring attention to the various parties the techniques that can be instituted, many by unilateral actions of private individuals and organizations. Where joint and mutual actions may be involved, HUD encourages such actions. Transportation inter-relates with adverse air quality and there are no simple or single action solutions. Hopefully, individuals, organizations and public agencies will undertake corrective measures where possible and preclude very serious air pollution that may require heavier intervention or mandatory solutions. HUD's powers are limited in this area, but it has a strong interest in the wholesome housing and urban enviornment.

In viewing the central cities and especially those with growing economic and developmental activities, such as San Francisco, there is more and more pollution of the air caused primarily by automobiles along with the growth of traffic congestion caused by automobiles.

To the problem of traffic congestion, there are two basic approaches: The first is to accomodate the automobile by traffic controls, wider streets and more parking garages. The second is to encourage and develop public transportation systems to attract people out of their cars.

This YBC Project presents a single large developmental activity with significant potentials for establishing a visible transportation strategy for San Francisco. HUD, after its review, concurs in the San Francisco strategy of encouraging the use and development of public transportation to meet the principal transportation needs of the YBC Project. This means that basic reliance is to be placed on public modes of transportation and non-accommodation to all the street widening and parking needs of private automobiles. This approach is also based on the concern for air quality in San Francisco and the YBC Project area in particular. The several mitigations identified in the Air Quality analysis of this EIS also are applicable mitigation measures for Transportation impactions.

A major adverse impact in YBC is the shortage of private automobile parking spaces. At this time there are some 5,800 temporary parking spaces in the YBC Project area. This does not include the 5th and Mission parking structure which has 1,788 parking stalls. Almost all of these parking needs are generated by non-Project destinations. Most of this parking did not exist before the YBC Project and was never intended to be continued after development. Nevertheless, the estimated 5,410 cars now in these lots will have to either find other parking or join private car pools or utilize public transportation.

In addition, full project activities (but without development of the 900 housing units) will generate the potential need of parking spaces for an estimated 10,200 cars. Thus the total parking spaces to be displaced (5,800) plus new needs (10,200) may rise to a potential of 16,000 parking spaces. About nine garages the size of the existing one at 5th and Mission Streets would be needed to provide 16,000 parking spaces.

The estimated Project supply is about 4,140 parking spaces, including 800 street spaces, a small use of the Fifth and Mission Public Parking structures and 3,085 required parking spaces in office and commercial buildings. An additional 1,250 may be developed in a public garage under a "permitted" use in the Project plans. In the event this additional public garage is constructed, the net deficit of parking is estimated at 4,800 -- based on Project needs alone. If the permitted use of 900 housing units were constructed, the 4,800 parking deficit would disappear. Housing provides its own parking and its construction would replace industrial/office construction. It is the industrial/office space activities which generate much of the parking needs.

HUD believes that this 4,800 deficit potential and the 5,800 (to be displaced) must be met primarily by public transportation facilities. Authorization of or a requirement for this number of parking spaces would also cause substantial increases in carbon monoxide air pollution and more traffic congestion.

The 5,410 persons now using most of the 5,800 current parking spaces are long-term parkers, that is they park most of the full day and are not one to three hour parkers. Almost all of these people are believed to be persons employed full time near the Project area. The parking costs per day: Mission Street - $2.25; Howard Street - $1.25; and Bryant Street - $.60.

On full Project completion in 1988, an estimated 40 percent of the YBC working force will commute from Marin, East Bay and the Pensinsula. The remaining 60 percent are San Francisco residents. And, with the advent of the underground Muni service along Market Street, the San Francisco public transportation capacity will be greatly increased. Project mitigation potentials identified in the Air Quality assessment of this EIS will also increase BART capacity. Other public transportation modes can be expected to receive increasing pressure for passenger services as the Project developes.

HUD feels that the Project parking needs must be met by public transportation. As the Project developes, increasing pressures will be felt by all parties in and near the Project and responses to these needs will and must come from public transportation.

HUD has not sought to obtain guarantees or specific project proposals by these transportation agencies to meet future anticipated service needs. The Project build-up schedule is uncertain and additional facilities for increased capacity will require funding.

As available parking becomes scarce, there will be an increase of "cruisers" looking for parking spaces. This will add a degree of adverse air pollution. Crusing will continue during and after Project build-up and until the attraction (benefits) of public transportation out weigh individual threshold preferences for their own personal transportation -- when people find it more convenient and/or cheaper to use the Muni, or BART, etc. than their own cars. Some parking must be provided for those who must drive for business or special reasons. The parking provided by private parking and the limited street and public parking is designed for this purpose.

The deficiencies of existing public transit systems serving the Project area are rather well known. HUD cannot compel improvement. On the other hand, HUD does not believe that more parking spaces and other means to accommodate more and more cars is an acceptable solution. Accordingly, there will be cruising and inconveniences until public transportation agencies and companies meet the objectives of their franchises.

Most of the Convention Center visitors are from out-of-town and would attend Convention Center activities by shuttle services. This is the same transportation now being used by hotels and motels to move people to Brooks Hall and other activities in San Francisco.

A special parking study is being prepared by a well-known engineering firm for the City of San Francisco. The report on this parking study is scheduled for mid-March 1978. HUD will consider this report in its Final EIS.

The potential mitigation measures are discussed for each of the transportation impacts in order. These measures, as previously discussed, are for persons, organizations and agencies to review and consider for themselves. HUD control or capacity to enforce is limited.

PEDESTRIAN CONGESTION

1. Increase capacity for pedestrian movements on existing sidewalks.

   The effective width available for pedestrian movement on Third, Fourth, Mission and Howard Streets could be increased by careful placement of sidewalk furniture, such as planter boxes, benches, newspaper racks, kiosks, etc. Parking and tow-away signs should not be the two-pole signs nor otherwise be an obstruction on the sidewalks. Sidewalks could be widened through setback of building lines in the YBC area. This could be accommodated at the time of design of spacific structures. Blocks CB-2 and CB-3 particularly would lend themselves to this type of treatment as would much of the east side of Third Street. Special attempts could be made to affect such widening at high volume transit stops to help eliminate the pedestrian/bus patron conflicts.

The Redevelopment Agency is aware of these possibilities and will take them into consideration during its site planning. Increase capacity for pedestrian movements would result with a pedestrian walkway and pedestrian bridges from the convention center to Market Street.

A pedestrian concourse is recommended in conjunction with the convention center. The concourse would penetrate all the way to Market Street; current design calls for pedestrian bridges at both Howard and Mission Streets, and ramp access to BART in CB-1. The effective width of the concourse for pedestrian movement would be enhanced by the "furniture" placement suggested in the previous mitigation measure.

While the pedestrian concourse is part of the Project plans, the two pedestrian overpasses are not. This note is to encourage the Redevelopment Agency to build the two overpasses if it is financially able to do so. The overpasses would be very helpful in reducing sidewalk overcrowing and for pedestrian pleasure and safety by separating them from automobiles and truck traffic.

2. Improve the flow of pedestrians at intersections by upgrading existing traffic signal hardware.

All of the intersections in and adjacent to YBC could be equipped with pedestrian crossing signals ("Walk"/"Don't Walk") for controlling the flow of pedestrians at intersections. The timing of these pedestrian signals could be set to minimize the interference of pedestrians and vehicles, thus increasing the efficiency for both types of flow. All of the major streets in YBC are on the Federal-aid urban system and as such, modernization of the pedestrian signals is potentially eligible for 70 percent Federal-aid highway funds. The potential benefits of a "scramble" system, already in use at peak hours at some downtown intersections, where all vehicular movements are stopped during one signal phase to allow four-way and diagonal pedestrian crossing, could also be investigated for implementation.

The Redevelopment Agency is urged by HUD in this EIS to investigate the potentials for this federal assistance for pedestrian signaling.

3. Improve the flow of pedestrian movements through the use of police point control at intersections.

During times of peak vehicle-pedestrian flows (such as those associated with special convention center events) police officers are expected (as they normally do) to be assigned to control the highest conflict intersections to facilitate both pedestrian and vehicle movements.

TRANSIT AVAILABILITY

General

It is recognized that to minimize congestion and maximize the movement of persons in the YBC area, heavy reliance must be placed on all transit agencies serving the area. Plentiful, convenient, and timely transit must be available to displace the current reliance (of many persons) on an automobile to reach YBC. Given the above, the following specific actions are recommended:

1. Provide additional capacity on the Southern Pacific commuter trains to meet anticipated added demand.

   Additional rolling stock is available which could be brought into use and increase peak-hour train capacity. The authority to add additional cars would come from the Southern Pacific Company. If SP remains in the commute business, and if current SP policies continue, available cars would be brought into service to maintain the one-seat-per-passenter SP policy.

2. Provide additional peak hour capacity on the SamTrans bus system.

   The overloads indicated to occur on the Highway 101 Route could be alleviated by additional buses, headway changes, or routing shifts to the I-280 route to San Mateo County. It is expected that a combination of all three actions would be required to satisfactorily eliminate the overloads. The San Mateo Transit District is the agency responsible for assignment and scheduling of additional buses. Additional buses, if needed and justified, could be acquired with an 80 percent Federal-aid grant from the Urban Mass Transportation Administration subject to the district's ability to provide local capital and operating funds through their taxing and revenue system.

   This and the following mitigation measures will necessarily be addressed by Southern Pacific Railroad Company and SamTrans according to transportation demands to and from the Peninsula areas. These demands will build-up as the Convention Center and other structures are erected and occupied.

3. Increase capacity of the Muni system in the Market Street corridor.

   The planned addition of the MUNI METRO will increase the Market Street corridor capacity and could attract additional patronage from other routes. The expansion of existing above ground service also would relieve overloads in the Market Street traffic corridor. As with the peninsula service situation, additional transit vehicles may be required to provide the needed capacity on the Muni system. Again subject to a demonstration of need together with assurance regarding local ability to participate and provide operating cost, Federal-aid in the amount of 80 percent of the costs for the vehicles and appurtances could be provided by UMTA.

4. Encourage increased use of transit through provision of fringe and corridor parking facilities.

   Convenience of transit greatly effects its acceptance. Provision of low cost or no-cost parking lots outside the downtown area convenient to major arterials and transit lines such as BART, S.P., Golden Gate Transit, SamTrans, A-C Transit, etc., would encourage transit patronage by intercepting the automobile driver before he is committed to the full trip. Federal-aid funds administered by the Federal Highway Administration through CALTRANS are available to assist such an effort on a 70/30 basis. This type of lot is already available along the BART lines with expansion of the Daly City lot accomplished and expansion of the Pleasant Hill lot being actively planned.

5. Increase the use of transit by issuance of commute books or transit "Fast Pass."

   These types of incentives to reduce the number of automobiles could be provided voluntarily by transit agencies and by private management. SamTrans is now selling SP commute books at reduced rates and Muni is issuing a monthly "Fast Pass." These measures could especially reduce the need for parking by commuters.

INTERSECTION CAPACITY

1. Lessen congestion at critical intersections through increased use of staggered work hours.

   The use of staggered working hours would spread the peak loading of traffic throughout the p.m. peak period, and thus reduce the projected volumes during the peak 15 minutes. Implementation would normally be voluntary and would require the support of the entire downtown business community. Staggering of hours would also reduce peak-pedestrian levels. Some employers in the downtown area already have implemented staggered working hours ("flex-time"), partly to lessen the amount of traffic congestion that would be experienced during the evening peak hour period. Since non-YBC traffic dominates the traffic on YBC streets, maximum benefits would require staggered hours beyond the YBC boundary.

2. Improvement of traffic flow through fully interconnected and synchronized traffic signal system.

   A fully integrated and synchronized traffic signal system would assist the flow by assuring "waves" of traffic could move down the major arterials without a stop at every intersection. Depending upon the sophistication of the system, special transit or emergency vehicle "prempt" features could be included; inbound or outbound flows could receive priority; or even certain streets receive priority response. Federal-aid urban system funds could be used to assist (70/30 Federal/local-State match) in modernizing the YBC area signal systems.

3. Reserve a predominant direction lane (or lanes) for exclusive use by buses, jitneys, or high occupancy vehicles.

   The implementation of this measure would offer encouragement to the use of vanpools, and carpools as well as currently available transit and jitney service. It could be used in conjunction with premption features on the signal system or "banned" turns by other vehicles during "reserved lane" times.

4. The use of van and car pooling to help lessen traffic congestion.

   The State has had limited success in establishing car pools.

   A concentrated effort is necessary if carpools are to be more successful. Local government could budget funds or assign a transportation-related employee to coordinate such an activity. Van pooling may be more popular than car pooling as the van would be supplied by the agency or company for the use of its employees. Golden Gate Transit started a van pool arrangement in December 1977. A newly formed organization representing public and private agencies and called "Rider for Bay Area Commuters" could assist this mitigation measure.

5. Use of shuttle buses for special events or major conventions.

   For events at the convention center shuttle buses are now used to move attendees to and from outlying parking areas (such as San Francisco pier area) or hotels catering to the event. For events such as concerts or ticketed attendee shows this would be the responsibility of the organizers of the event, who could add the costs to ticket prices. Outlying parking/loading lots would have to be provided. Long-term arrangements could be coordinated by convention center management, which could use the same lots for truck storage.

6. Increase the use of jitneys and taxis.

   Jitney service now exists along Mission Street and south to the various transit terminals. There is a transit preferential lane along Mission Street; the jitneys could be allowed to use this lane as well as any others developed (as described in 3 above) as a qualifying transit vehicle. Increased use of taxis could improve the flow of traffic and lessen the need for parking within the YBC.

7. Improve special event access to Convention Center through reserved lane usage on Howard Street.

   Although a special passenger arrival/departure area has been recommended for the Howard Street entrance to the Convention Center ingress and egress to this area would be facilitated by temporarily barricading the left-most lane on Howard Street. If the occasion warranted, the barricaded lane could also be used for passenger loading and unloading area.

8. Improve traffic flow efficiency through the location of driveways for off-street parking.

The flow of traffic on downtown streets can be improved through the provision of proper and easy access to off-street parking and loading areas. A suggested practice in designing entrances in the YBC would be to do the following:

a) Place driveway openings at least 50 ft. from crosswalk locations.

b) Make driveways a minimum of 24 ft. to 30 ft. wide for two-way movement.

c) Provide at least 50 ft. of curb between adjacent driveway locations.

d) Limit the number of driveways to two per parking establishment.

9. Ease congestion in YBC area through connection of I-280 and I-80 and completion of planned additional access to I-280 at Fourth Street.

To the maximum extent possible non-YBC oriented traffic should be kept from the area or travel curtailed as much as possible. Completion of the long-planned gap between I-280 and I-80 in the vicinity of the Oakland Bay Bridge could aid in this effort. Provision of the Fourth Street entrance to I-280 southbound could also keep certain traffic from travel through YBC. Federal-aid Interstate funds in the ratio of 90% Federal monies is available for this project.

CONSTRUCTION AND TRUCK ACTIVITIES

1. Establish truck routes for construction activities.

Haul trucks (spoils, construction materials) might not be permitted on important transit routes such as Mission Street and Market Street. Trucks might be directed to and from the James Lick Freeway and I-280, using Third and Fourth Streets, and restricted from all streets during the a.m. and p.m. peak periods. The obstruction of streets during peak traffic periods is already prohibited.

2. Provision of parking for construction workers to minimize parking congestion.

Construction workers might be encouraged to ride transit facilities to and from work. Provision of on-site parking would reduce localized parking demand. Shuttle buses or special fast-passes

for Muni service from outlying lots (such as pier area) could be provided for construction workers. This or these areas could later be incorporated into a YBC parking/shuttle bus program for employees and/or events.

3. Locating loading areas for truck deliveries to minimize congestion.

Truck activity associated with the convention center would be heavy during set up and take down of conventions and exhibits. During these times, off-site waiting areas for trucks could be provided when other on-site loading and waiting space is insufficient. Funding for acquiring off-site areas could be provided by a mix of public and private money. (The private sector would consist of the companies whose trucks would use the areas.)

PARKING

1. Increased use of employee car pools and transit for shopping trips to reduce the need for parking.

The mitigating factors relating to car/van pools and transit have been discussed earlier in this section. The existing shopper shuttle could be rerouted to serve the YBC thereby reducing the need for parking and, when parked, the need for parking and uparking during the work day.

2. Adjustment of parking rates to regulate short-and-long-term parking.

A most expedient method for controlling parking in the YBC area would be by regulating the short-term and long-term parking rates. In general, a high rate for all-day parking would discourage all-day parkers (commuters) from using such facilities, while a low hourly rate for one or two hours would permit the short-term visitor to park inexpensively.

3. Zoning ordinance controls on parking supply.

The City's zoning ordinance does not require, but actually restricts, the provision of parking in a C-3 district. This recognizes that the solution of perceived parking deficiencies may encourage traffic congestion in the central business district. Whether additional long-term parking supply would be constructed within walking distance of YBC is an economic problem. It is recognized that shortages of parking in YBC could lead to motorists' circling the area looking for a parking place, thus wasting energy and releasing more air pollutants. Another possibility is that shortages of parking would encourage further uses of transit. Still another is that use of YBC would be discouraged for users who depend on the automobile.

FOOTNOTES

[1]Count taken: Monday, December 20, 1965; 1:55-2:55 p.m., by the Market Street Design Task Force. Counts during other times of the year were less, in proportion to gross sales. No more-recent data have been located.

[2]The discussion in this paragraph is based on TJKM field observations, July 14-22 (Thursday-Friday), 1977.

[3]Defined by the Transportation Element (page 24) of the Comprehensive Plan, City Planning Commission Resolution No. 6834, April 27, 1972, as a route "of major arterial transit lines" where interference with transit vehicles by other traffic should be minimized.

[4]By EIR Team members (TJKM) on Wednesday, September 7, 1977, on Mission Street, west of Fifth Street.

[5]Officer Martindale, San Francisco Police Department, Taxicab Detail, telephone communication, September 23, 1977.

[6]Highway Research Board, Highway Capacity Manual 1965, Special Report 87, National Academy of Sciences, National Research Council Publication 1328.

[7]City and County of San Francisco, Department of Public Works, Study of High-Accident Intersections, Traffic Safety Study, October, 1974.

[8]Commercial Vehicles In a Large Central Business District, City and County of San Francisco Department of Public Works, 1973.

[9]Parking inventory for the downtown area was supplied by the Public Works and Planning Departments; personal interview with Edward A. Green, Transportation Planner, Department of City Planning, on August 15, 1977.

[10]EIR Team (TJKM) Field Survey on Thursday, July 21, 1977.

[11]San Francisco Downtown Parking and Traffic Survey (DPATS, 1970), Department of Public Works.

[12]Fruin, J. J., 1971, Pedestrian Planning and Design, Metropolitan Association of Urban Designers and Environmental Planners, New York, N.Y.

[13]Transportation Conditions and Trends, 1976, San Francisco Department of City Planning.

[14]Muni Metro data from conversation with G. Cauthen, Senior Civil Engineer, S. F. Municipal Railway, August 19, 1977.

[15]T. Standing, Junior Civil Engineer, G. Cauthen, Senior Civil Engineer, S. F. Muni, August, 1977.

[16]BART Impact Program Traffic Survey Series, A-48, April, 1977, Institute of Transportation Studies, University of California, Berkeley.

[17]Board of Supervisors' Resolution 240-76 (1976).

[18]J. MacArthur, HOK (convention center architects), telephone communication, November 10, 1977.

[19]Some union contracts limit walking distance and would require worker parking on-site. With respect to the convention center: Turner Construction Co., the construction management firm, does not permit parking by construction workers on-site while a project is underway.

ALTERNATIVES

The "alternatives" to the Project are the major Project substitutions considered by HUD. There are a number of minor design determinations and many project modifications considered (and required) under the Section on Unavoidable Impacts. These project modifications to mitigate adverse impacts are not included nor defined as alternatives to the Project.

One of the objectives of considering alternatives to the proposed Project is to consider other possibilities which avoid the undesirable impacts of the Project. In this YBC Project, the existing environment contributes most of the adverse impacts on the Project. With the exception of increased vehicular traffic generated by the Project activities, including the permitted uses in this EIS, the Project is not considered to be a major environmentally adverse development. This is not to suggest that the Project and its permitted uses do not utilize energy, contribute to sewage, etc., but rather to identify the fact that traffic is the major adverse environmental element. It should be noted that most of this traffic (congestion, noise and air pollution) is already in the Project area and generated from destinations outside of the Project.

The following alternatives for the development of the area known as YBC have been considered:

I. No Project
II. Disapproval of changes requested by Redevelopment Agency
III. New Town concept
IV. Conversion to a park
V. Selling land to highest bidder

I. No Project

The "no Project" alternative is mandated by the EIS guidelines for consideration. It was intended to enable readers, among other things, to consider alternative project concepts and the likely environmental trends absent the project.

In this instance, this "no project" alternative is possibly misleading since the absence of the Redevelopment Agency's proposals or a HUD decision of no approval would mean the continuation of the presently approved Urban Renewal Plan for the Project.

With a no project concept, the financial obligations and existing contractual requirements between the Redevelopment Agency and HUD would continue without change. No financial jeopardy to HUD would be involved. Environmental concerns and analysis of the previous HUD EIS in 1974 on this Project would remain outstanding.

II. Disapproval of Changes Requested By Redevelopment Agency

The changes being considered by the Redevelopment Agency are the "permitted uses." The sum of these potential changes was sufficient

to require HUD to undertake the preparation and public distribution of this EIS. The potential changes being considered or to be considered by the Redevelopment Agency to carry out the YBC Project are currently awaiting HUD's decision. The alternative of disapproval of these permitted uses warrant special attention. Each major item is separately identified and discussed below:

1. The sports arena is no longer in the development program. The deletion of the previously proposed sports arena is a major change. Its removal from the redevelopment proposal has been occasioned by the recognition that it is no longer financially feasible. The City of Oakland has developed a sports arena as part of its Coliseum development — including the indoor sports arena and a baseball/football stadium. The San Francisco Bay Area is apparently considered without sufficient sports interest to support two large sports arena complexes. When this arena was found infeasible by the Redevelopment Agency, HUD was and is not now in a position to insist on its construction. The Sports Arena was a permitted use under the Urban Renewal Plan and not a requirement for the financial or environmental integrity of the Project.

2. A Convention Center will be developed on Central Block #3. It will be underground if feasible and will contain no on-site parking.

   The shifting of the Convention Center becomes a re-design concern with the deletion of the sports arena. The deletion of parking as part of the Convention Center raises HUD's concern for transportation throughout the Project.

   When the Convention Center was to be at ground level and adjacent to a sports arena, parking under the Convention Center was a solution to meet the parking needs primarily of the sports arena. Now that is no longer necessary. Moreover, the Convention Center transportation will be primarily by shuttle bus services, as is now for Brooks Hall and Cow Palace. Additional participants are to be encouraged to utilize public transportation (See transportation assessment) and discouraged from utilizing the few additional parking spaces that are to be provided.

HUD does not find the shift of the Convention Center to be inappropriate, particularly since the sports arena is deleted. Moreover, the elimination of parking under the Convention Center is acceptable due to the recognition of design changes and the changed need for parking. HUD's strategy is to encourage the use of public transportation and shuttle buses.

3. A recreation/entertainment complex to be developed on the surface, particularly over the Convention Center, or in CB #2 if the apparel mart does not materialize. The complex may contain a mixture of recreation, commercial, entertainment and cultural uses.

   This recreation/entertainment complex, as an alternate permitted use, provides additional flexibility to the Redevelopment Agency and the City of San Francisco to carry out the YBC Project. It becomes another design potential with the elimination of the sports arena. It provides further flexibility in the event the apparel mart is shifted in location or dropped altogether.

   While the details of the recreation/entertainment complex have not been fully developed, the concept appears acceptable as it would become compatible with other uses. About 50 percent of the land may be covered by a series of low-rise buildings relating to the above noted uses.

   It will provide additional non-convention and convention supporting interests in the area. If successful, additional traffic will be generated into the area. However, such traffic, whether by public or private transportation, will be predominately during non-commute hours. In this way, little contribution to air pollution and noise will be made. Persons attending recreation/entertainment activities have knowledge of the transportation problems during commute hours. Like Brooks Hall and the Cow Palace, it will attract persons between and after commute hours.

4. Automobile parking permitted use.

   HUD agrees that parking should be held to an amount to serve primarily short-term users for the commercial and office building services and operations. The permitted use proposed by the Redevelopment Agency meets HUD's objective -- provided that a substantial amount of the 1260 parking spaces are addressed and that these are in addition to the private parking required.

HUD does not feel that this parking permitted use should be deleted, but it is an alternative that should be retained and encouraged. This is to provide the basic parking spaces beyond the private spaces required. While HUD feels that about 1,260 as indicated in addition to the 3,000 by private structures, is a reasonable number pursuant to the transportation strategy, a final decision will follow in the Final EIS. In mid-March 1978, the City of San Francisco's parking consultant will be submitted a report on this YBC Project. HUD's Final EIS will consider that report.

5. Historic preservation.

The Redevelopment Agency's changes under consideration include changing one or more building designations to meet the requirements of the National Historic Preservation Act of 1966 and related Executive Orders and implementing regulations.

HUD finds this alternative, as a permitted use, to be essential to carry out its own historic preservation responsibilities.

The specifics of the historic preservation considerations for eligible structures to the National Register of Historic Places is being concurrently resolved with this EIS. Similarly, consultations with the California State Historic Preservation Officer are concurrent with this EIS on matters of structural and historic district eligibility, potential eligibility of the Project as an archeological district, potential Project impaction of such eligible buildings and districts and the appropriateness and adequacy of proposed mitigation activities.

The final resolution of these concurrent historic preservation issues will and may utilize the flexibility of these permitted uses on historic preservation. Accordingly, HUD finds that this alternative must be retained as proposed.

6. Five land parcels permitting housing.

The alternative of these five parcels are to permit up to 900 units of housing. Most, or all may be considered and developed for market rate units. No further elderly units are being considered, but could be included. Most or all would be rental units, though sales in the form of condominium units or townhouses are also possible in this permitted use.

This potential alternative enables the Redevelopment Agency to have the flexibility of substituting housing for light industrial and office space.

The potential provision of up to 900 housing units is a substantial change in the Urban Renewal Plan. For a city, such as San Francisco, with a severe shortage of housing for all income groups and residential shelter users, there is a temptation to find a basis for abetting its development. The development of market rate housing for middle and upper income persons is consistent with HUD's objective to reduce population outmigration from central cities and revitalize stagnating or declining tax bases.

However, a similar need for office space exists in San Francisco. HUD finds that either office space or housing in the YBC Project are fully acceptable uses. HUD's preference for low and moderate income housing is not invoked because the housing is not programmed or designed by the Redevelopment Agency for such housing. Nor is it designed for elderly housing. It must be noted, however, that 602 units of subsidized elderly housing have been committed in the YBC Project. These and other committed housing for YBC relocation are pursuant to an agreement between the Redevelopment Agency and the TOOR group, as identified in Part V of this EIS.

HUD, accordingly, finds this housing permitted alternative acceptable. It is not rejected as an unacceptable alternative because of the flexibility it provides to the Urban Renewal Plan. Its use as housing or the space for office development are both viable and either would constructively contribute to the Project.

7. Potential Shift of Hotel Location.

There is a consideration for shifting the location of the 700 room hotel to Central Block 1. The office/entertainment/commercial space anticipated with the present hotel would not be affected because the hotel is proposed to sit on top of these activities. This shift would, however, reduce other potential development of office space by approximately 630,000 square feet.

The alternative of declining to approve the Redevelopment Agency of the option of this "permitted use" would not significantly affect the overall Urban Renewal Plan, except that the design of the Convention Center vicinity and the potential economic advantage of location for the hotel may be reduced somewhat. This alternative or permitted use is primarily one of the total site planning.

HUD feels that this alternative of eliminating the permitted use of the hotel location is not a major matter. HUD feels the Redevelopment Agency should be permitted the flexibility to develop the best Urban Renewal site plan and is in accord with this flexibility for location as a permitted use. The alternative should not affect HUD's financial arrangement with the Redevelopment Agency.

III. New Town Concept

This concept was reviewed in the 1974 EIS and rejected. It is considered again in this EIS because of new circumstances and because the HUD Program for a "New Town in Town" is still operational.

An initiative petition was circulated several years ago by a group known as Friends of Yerba Buena, calling for an alternative method of financing the YBC Public Facilities and for certain changes in the composition of the Project elements. Although the petition did not receive an adequate number of signatures to be placed on the ballot, it, nevertheless, presents an alternative to the currently planned project.

The initiative required the repeal of the existing financing agreement for YBC and commencement of a project in conformance with HUD's "New-Town-in-Town" program and the State's "New Neighborhood Community" program. The basic concept is the provision of balanced mixed land uses and social services in an identified underutilized or blighted urban area.

The initiative called for the following land uses in YBC in the percentages indicated below (exclusive of streets and public rights-of-way).

Percentage	Approximate Acreage	Use
25% (not less than)	14.1	low and moderate income housing; including not more than 10% of this total (approximately 1.4 acres) for a community health care and cultural center.
15% (not less than)	8.5	R-5 zoning classification (high density residential)
15% (not less than)	8.5	Public open and recreational space.
19% (not more than)	10.7	C-3-0 zoning classification (downtown office and commercial).
13% (not less than)	7.3	C-3-S zoning classification (downtown support).
13% (not less than)	7.3	M-1 zoning classification (light industrial and manufacturing).
100%	56.4 acres	

Height limits of 84 feet were proposed for all areas, except those zoned C-3-0. In the latter case, heights up to 240 feet were permitted. Public parking was prohibited.

Planning and construction of the low and moderate-income housing and of the community health care and cultural center would be financed through the allocation of not less than 20% of the annual funds received by San Francisco under the provisions of the State and Local Assistance Act of 1972 (General Revenue Sharing) until completion of the housing. Following construction, a percentage adequate to maintain the housing would be allocated annually. Hotel tax allocations of not less than 36% would be used to provide rent supplement payments to the residents of the proposed housing.

It is not specifically stated how the open space and other land uses would be financed, but it is assumed that the former would be developed and maintained with public funds, and the latter, privately.

The drafters of this initiative have indicated that the percentages presented above are to be considered as general parameters only, and not rigid requirements. Thus, although the percentages discussed here for purposes of analysis are those contained in the initiative, it should be remembered that these percentages are flexible.

Due to the lack of specific data, such as the number of square feet of commercial or manufacturing space, or the number, size and design of the proposed units, it is not possible to provide a detailed or specific economic or environmental assessment of the impacts of the proposed alternative. However, for purposes of making a general analysis and comparison of the proposed alternative, certain assumptions concerning this proposal are made:

(1) It is assumed that certain land uses in the existing Plan and the proposed alternative are comparable, and can, therefore, be ignored in the comparative analysis, since they balance each other out. Included are the following:

   (a) Approximately 33%, or 4.6 acres, of the alternative low and moderate income housing is balanced out by the acreage allocated for existing housing (Clementina Towers and a portion of Salvation Army Apartments) and proposed housing under the current plan (although the financing schemes are different);

   (b) The acreage proposed for manufacturing and light industrial uses in both plans is relatively comparable; and

(c) Approximately 50% or 12.5 acres of the currently proposed office space in the peripheral blocks area is balanced out by the alternative's 18 acres of C-3-0 and C-3-S land use allocation. (Due to the difference in height restrictions, one acre of alternative office space is considered to equal .7 acres of office space in the existing plan.)

Therefore, the essential land uses remaining to be compared are the following:

(d) Existing Plan: The entire Central Blocks area (approximately 18 acres, exclusive of streets and ways) and approximately 13.2 acres of office space in the Peripheral Blocks area:

(e) Alternative Plan: approximately 9.5 acres of low and moderate income housing, 8.5 acres of market rate housing, and 8.5 acres of public open space.

(2) It is assumed that the "net" alternative housing will include units for both families (approximately 20%) and single individuals or couples (approximately 80%) and will be of medium density since buildings are limited to approximately eight stories. An average of 50 units per acre is presumed, for a total of approximately 900 residential units, housing approximately 1,600 persons.

(3) It is assumed that no elaborate or expensive designs are envisaged for the public open spaces, and that development and annual maintenance costs would be relatively modest (approximately $500,000 and $50,000 respectively).

(4) Since the initiative called for City financing of the low and moderate income housing, it is assumed that, under both of these Plans, City funds would be required to purchase either 18 acres for the Central Blocks area or the 18 acres for the park and low and moderate income housing. If the initiative proposal were altered to call for development of these units by a non-profit sponsor, a portion of the land cost would be shifted to the sponsor. Although the cost of the land would likely be less for the alternative uses, the City would still be required to make up the deficit in the loan repayment fund of the Urban Renewal program, resulting from the reduced land proceeds.

Comparative Impacts

One unavoidable impact which would occur if any major development alternative to the existing YBC Plan were adopted at this time is the substantial expense in replanning the area. Not only would the existing cumulative investment of time and money spent for planning, administering, designing, and conducting intensive studies on the public facilities be lost, but similar investments would be needed for any alternative development plan. In addition, existing legal obligations to private developers would have to be honored in some fashion in any alternative plan. It can be anticipated that substantial added costs would be required for the proposed alternative for these purposes.

Comparing the net change in Project activities listed in "d" and "e" above, it is estimated that the proposed alternative would generate approximately one-half the solid and liquid wastes of the existing Plan, and the demand upon utilities and their related natural resources could be reduced by as much as three-fourths by the "New-Town-In-Town."

The existing plan would generate more surge traffic, particularly during evening peak period hours when the entertainment facilities are in use, thus contributing more to the noise and air pollution concentrations in the area. There is no way to compare the parking capacity of the two plans at this point, since the amount of parking for the alternative plan is not specified. Although public parking is prohibited, there is not a similar prohibition placed upon privately owned and operated parking garages.

The residential acreage proposed in the initiative would provide needed additional housing units in the City for individuals and families of various economic means, and would provide the benefit to the existing housing in the South of Market of increasing the residential nature of the area. However, this entire area is generally not considered superior for residential uses due to the existing high level of traffic, air pollutant concentrations, and noise generated by vehicles passing along the area's major thoroughfares, mostly to and from the nearby freeways. It would be necessary to provide special landscaping, insulation and engineering and architectural techniques to adequately protect the housing from these environmental conditions.

The publicly-financed housing and the public open space would involve substantially lower initial construction costs than the proposed Central Blocks public facilities. Additionally, whereas, the public facilities will begin to generate direct and indirect revenues to the City -- and, most importantly, revenues imported from outside the regional base -- as they become operational, the public housing and park would generate no revenues, but would conversely require continuous City funding for ongoing maintenance and operation.

Both the market rate housing in the New-Town-in-Town and the net office space acreage in the existing plan would provide property tax revenues, although these would be greater from the latter. The office spaces would also offer employment opportunities which would not be provided by the alternative housing.

Adoption of this alternative would provide needed additional housing units in the City, increase the residential nature of the area, further reduce some of the environmental impacts of the existing plan, and involve lower initial construction costs.

It would also mean the loss of planning investments for the current project and additional planning costs for the alternative proposal and loss of direct and indirect revenues from the currently planned public facilities and of employment opportunities, which are the major objectives of the current plan. As with the proposed low-income housing sites, mitigating measures would have to be taken to protect this housing from the current traffic and noise conditions in the area.

Thus, although this alternative offers certain benefits to the City, it does not satisfy many of the objectives established for this plan by the local governing body and approved by HUD in accordance with the Housing Act. The balance of impacts is such that rejection of the current plan in favor of this alternative does not appear justified.

IV. Conversion of Part or All of the Project Area to Park and Recreational Uses

Three variations have been suggested involving park and recreational uses in the project area. These include converting the entire area to a park, converting the two major central blocks to a park, and converting the Sports Arena site to a park.

Major attention is directed here to the second variation since it has been the subject of extensive study by members of San Francisco Ecology Center. The first alternative is no longer feasible since land disposition contracts have been signed with a number of private developers for land parcels in the area. In addition, it can be considered gross underutilization of prime downtown property. It would cost the City with no financial return to repay the investment or to provide overall economic benefits to the City.

The third variation is not considered to be a major alternative since it could be implemented within the current objectives of the Redevelopment Plan, without requiring overall rejection of the Plan as it now exists. However, since this variation has been the subject of extensive discussions, it is used here as a basis of comparison with the Ecology Center's proposal.

The Ecology Center proposes that the two major central blocks bounded by Mission, Third, Fourth and Folsom Streets be converted to park use. Construction of the park would eliminate nearly all of the environmental impacts of new development, though these are not major adverse impactions.

By referring to the preceeding impact sections, deleting the environmental impacts generated by the currently proposed Central Blocks, and assuming no negative effects from the park, it can be seen that the park alternative would also reduce other impacts of the project, including liquid wastes and electrical consumption by approximately one-half, and solid wastes and natural gas consumption by approximately one-fourth. However, these impacts of the currently planned project are not considered to be major, and are expected to be further mitigated by steps to be taken by the City and the Agency. The effect of the park, while improving the environmental nature of the project, would not have major significance in terms of overall City impact.

Aesthetically, the park alternative would provide a large tranquil green space in the center of the City which would be pleasing to both the participant and the observer. The currently planned Project is expected to be more urban but still tranquil.

As pointed out by the Ecology Center, the currently planned project is costly and will require extensive commitment of resources by the City. Unlike the park, however, the currently proposed central blocks generate needed employment for the City's unemployed and underemployed which is one of the Plan's primary objectives.

Replacing the central blocks area with a park would not reduce the projected major adverse environmental impacts of the project. The Project's adverse air quality and the traffic congestion already exists and is not a result of this Project. Adoption of the park proposal would require rejection of major elements of the previously approved plan, its objectives, and completed activities. Although substantially less expensive in terms of initial costs, the park would not be a long-term employment generator in the City.

Thus, although this alternative offers certain benefits to the City, it does not satisfy many of the objectives established for this plan by the local governing body and by HUD in accordance with the Housing Act. The balance of impacts is such that rejection of the current plan in favor of this alternative does not appear warranted.

V Selling to Highest Bidder

A final alternative to be discussed is that sometimes referred to as "selling out and closing down the Project." The idea is that the Redevelopment Agency should simply advertise the various remaining parcels in the Project "for sale." The disposition method would be by an approved auction method and designed to return the maximum dollars back to the Project. The land would be sold for development in conformity with the existing Urban Renewal Plan, but within that Plan, the developers would have freedom to design, utilize permitted uses, etc.

To some of those who are "sick and tired" of the vacant areas of YBC and desire to see immediate and full development, as well as a return of the property to the tax rolls, this selling to the highest bidder has strong attraction.

The process, however, could not be as simple as the idea. There are a number of historic buildings in the Project and these structures, together with their setting and possible Project impact, must be cleared. This includes the eligibility issues with the Secretary of the U. S. Department of Interior, eligibility and project impaction issues with the California State Historic Preservation Officer, and adverse impactions on eligible properties to the National Register with the Advisory Council on Historic Preservation.

Selling to the highest bidder would result in the loss of a significant area of land assembled for a comprehensive development. Despite the Project's problems in the past, the opportunity exists for a cohesive development with considerably more aesthetic potential than could be achieved by abandoning the concept formed around the central blocks. Haphazard development without overall design objectives would not likely yield to the City a development to utilize existing systems nor complement other existing services and facilities.

HUD finds that this alternative is not acceptable because its own financial position would need further guarantees and possible funds from the City; that it could not approve the approach without a further environmental assessment on impacts and historic preservation; and that it does not assure an improved development nor more rapid Project development.

Part IX PROBABLE ADVERSE ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

The following discussion represents the adverse impacts from the development of the Yerba Buena Center as proposed, including "permitted" uses and the actions that will be taken to minimize adverse environmental impacts. Many minor requirements, such as fire and safety codes are not identified here because they are enforced through the local permit and license procedures.

Housing and Business Relocation

The changes proposed by the Redevelopment Agency will not result in displacement of persons or businesses not already contemplated under the existing urban renewal plan. Relocation assistance will be provided by the Redevelopment Agency to the remaining persons. Pursuant to the Uniform Relocation Act of 1970, replacement housing will be made available by new units to be constructed in the project area or preference given by the Housing Authority or owners of HUD-subsidized housing. The Redevelopment Agency will also assist remaining businesses to be placed in new YBC buildings or outside the project area.

Economics

The project as a whole may have some adverse economic impacts on other parts of the City such as competing office sites and existing convention and meeting places. However, the proposed changes to the office, commercial, and support phases of the project should have little effect. Dropping the Sports Arena will be beneficial to the extent that it would have been costly to build and athletic teams might not have been available to provide sufficient income to pay for its construction or maintenance. The Convention Center is limited in costs by litigation.

The proposed plan change to permit up to 900 units of market rate housing would have the immediate effect of bringing less revenues to the Agency in land sales price, and reduced sales, business and real estate taxes to the City. On the other hand, housing would be beneficial in that it would provide an income mix and more residents-serving commerce in the area. It would also bring housing into the area for some persons who would be working in YBC and thereby somewhat reduce commuting with its traffic and related problems including parking. More residents would add more evening life to the downtown area with the con-commitant use of commercial and entertainment establishments.

Financial Feasibility

There is one negative impact which may occur as a result of the full development of Yerba Buena Center within this area of environmental assessment. Although not necessarily probable, it is possible that the effect of introducing a recreation/entertainment complex and/or additional residential housing to the YBC Plan could range from reducing the amount of excess land proceeds anticipated to creating a land proceeds deficit. If there is a land proceeds deficit and the deficit is made up from Community Development Block Grant funds, this would mean there would be less block grant funds to undertake other housing and community development activities. An additional effect could be that repayment of the loan could be postponed for a period of time thus requiring an additional small amount of Community Development Block Grant funds to pay the interest charges.

In view of the fact that: 1) the remaining Federal grants for this project are assured; 2) that under the Community Development Block Grant Program San Francisco is assured of about $26,000,000 a year from which any deficit can be funded; 3) the amount of any potential deficit does not appear to exceed 20% of the City's annual Community Development Block Grant entitlement; and 4) the City has been providing Block Grant funds to cover interest costs; the Federal interest in this project does not appear to be jeopardized by the plan changes being considered.

If the Redevelopment Agency and City take any action with respect to this Project that results in a land proceeds deficit and the City were not to voluntarily provide local or Community Development Block Grant funds to cover the deficit, HUD could withhold up to 20% of the City's grant in any year for repayment of the outstanding loan for the Yerba Buena Center Urban Renewal Project.

Sewers

A potential adverse impact which could occur as a result of the proposed changes would be the result of underground placement of the convention center. The discharge of dewatering of the site will be into the city's sewer system. This impact could continue until completion of the sewer project providing expanded capacity in 1982. Mitigation based on storm flows will be imposed by the City.

The Agency has informed HUD that it intends to impose installation of various requirements in residences and park space to reduce water use and liquid wastes which are normal impacts of development, and take measures to assure that short-term impacts from wastes during construction will be mitigated.

Solid Waste:

At full development, including the existing and committed uses, the Yerba Buena Redevelopment Area is expected to produce approximately 3.3 per cent of the 662,100 tons of domestic solid waste projected for San Francisco by 1990. Insofar as the generation of solid waste is concerned, the choice of one or all of the five "permitted" use sites for housing instead of their designated uses would not substantially increase the total production of solid waste as a percentage of the total San Francisco solid waste. The same can be said for the "permitted" shifting the hotel site and/or the construction of a public parking garage on the northwest corner of EB-3 instead of the designated office and retail use. However, the development of a recreation/entertainment park, rather than a public park, could increase the designated impact by some 2,000 tons per year. This would increase the total solid waste production by Yerba Buena Center Redevelopment Area to nearly 3.6 percent of the total estimated San Francisco solid waste production in 1990.

Disposal of the excavation material from all developments in YBC as well as all construction debris would be made in private (not municipal) fill sites and final arrangements will be made by the excavating and/or developer contractors.

Undergrounding of the convention center will result in the necessity to remove large amounts of soil. Most will be used for landfill elsewhere, some for landscaping the park if it proves acceptable for the purpose, and some in the foundations.

Noise

A substantial noise level exists in the Project area - generated from existing traffic flowing on the streets of the Project and from the nearby freeway on the southern end. Depending on the location of specific housing sites and the architectural designs for these residential structures, there may be noise at levels requiring special mitigation. HUD noise standards for residential uses will apply to all housing in the Project through stipulations in land disposition agreements.

Hydrology

Due to potential overflows onto streets by the City's combined storm and sewer system during unusually heavy rains, HUD will require all housing sites in the Project to be protected by the Department's flood elevation requirements. This is a precautionary measure since the City's emergency system and wastewater program and construction schedule is expected to protect the Project against unhealty and unacceptable conditions.

Ecology

Construction activities will force rats out of old sewer lateral lines which they inhabit. The Redevelopment Agency will, prior to each demolition or construction activity, consult with the U. S. Department of Health, Education and Welfare in accordance with its procedures to implement appropriate rat control procedures. This will be a requirement of all contracts for such activities.

The project area contains a variety of soils problems as set forth in the Geology and Seismology Section. In order to assure safety during construction and stability upon completion of the structures the following measures will be taken:

- All buildings will be designed in accordance with recommendations of soils engineers which will be reviewed by city engineers, and in the case of HUD-assisted housing, HUD engineers;

- Buildings will be designed in accordance with local codes.

Historic Preservation

HUD is consulting with the U. S. Department of Interior, the Advisory Council on Historic Preservation and the California State Historic Preservation Officer relating to several properties in the Project. These procedures are pursued by HUD to establish the eligibility of such properties on the National Register of Historic Places and to establish acceptable mitigation measures on such properties that may be adversely affected by this Project. These official negotiations and consultations are underway concurrently with this EIS and the Final EIS will report on these procedures.

Two buildings which HUD has found eligible for inclusion in the National Register of Historic Places as a part of a historic district will be demolished because they are not financially feasible to maintain: the Blumenthal Building at 87 -3rd Street, and the Williams Building at 693 Mission Street. The Redevelopment Agency, in accordance with Advisory Council on Historic Preservation Procedures, will take photographs of the buildings and provide a written historical record of the district. A third building eligible for the Register at 360 - 4th Street is scheduled for demolition, but negotiations are underway to save it.

HUD is also concerned that the excavation activities throughout the Project may uncover historic or prehistoric artifacts. HUD is consulting with the California State Historic Preservation Officer and the U. S. Department of Interior to ascertain if the entire YBC Project is eligible for nomination to the National Register, along with a proposed archeological monitoring program. HUD in these consultations feels that archival and exploratory excavations for historic artifacts are not necessary, but recommends an on-the-site monitoring program.

Climate and Air Quality

Excavation and construction could cause considerable dust in the air. All land disposition agreements will contain conditions requiring contractors to follow dust control measures without the use of chemical dust supressents.

Concentrated high-rise development will cause a wind tunnel effect. The Agency will require developers to conduct a micro climate analysis, including wind tunnel tests prior to designing and positioning their high-rise structures.

Ambient air pollutants will periodically exceed Federal air quality standards for residential uses as set forth at length in the section on Climate and Air Quality. Land disposition agreements will require all housing in the project to contain air mitigation features to meet HUD guidelines. This will assure the air quality for the inhabitants will meet HUD guidelines for residential uses. HUD has also recommended that available Federal Highway Administration funds be sought and committed to complete freeway links to by-pass the Project and thus reduce air pollution in the Project area.

Transportation

The Project area now serves as a major through-way for public vehicular transportation, intra-city type trucks, jitneys, taxicabs and private automobiles. Currently, the Project has 5,800 temporary parking spaces which will be eliminated with Project development. Without the permitted housing units, YBC Project needs will be short 4,800 parking spaces over its projected needs (10,200 parking spaces) based on normal parking requirements. The development of the 900 units of permitted housing would utilize substantial portions of the light industrial and office space. This housing replacement use would reduce the needs in the Project by approximately 5,000 parking spaces.

Traffic is presently congested in the Project area from public transportation, trucks, automobiles, taxis and jitneys. The Project contributions to the congestion will develop incrementally during the construction phases and on Project completion. HUD concurs with the City, the U. S. Department of Transportation and the U. S. Environmental Protection Agency on the strategy to encourage the use of public transportation and not encourage nor seek to accommodate private automobile parking. Accordingly, HUD will not require full parking requirements for either the Project needs nor to continue the temporary parking now existing in the Project. The increasing congestion is considered as unavoidable and its mitigation will come with greater use of public transportation. The City parking study, scheduled for release in mid-March, will be reviewed for consideration in the Final EIS.

Full project development will contribute to the overloading of sidewalks when a large convention is adjourned, to the auto traffic of Project offices during commute hours, and to the Muncipal Railway, SamTrans and BART, also during commute hours. Assistance for these public transportation agencies is available to better meet these overloads on equipment by seeking federal funding assistance, as suggested.

PART X: RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The total buildout of the Yerba Buena Center Redevelopment Area would not be a single "Go" or "No Go" kind of decision. Rather, in the context of the developmental process, there will be a variety of independent decisions made by the various developers of the many parcels in YBC, by the City, by financial institutions, HUD, and others. While the initial decision by HUD following the circulation period of the final EIS will be to either approve or disapprove a proposed amendment to the existing urban renewal plan, this document has examined all of the various elements of the proposal to redevelop Yerba Buena Center in order to assess the overall environmental impact of total development.

Overall, therefore, the short-term uses of this particular Project are defined as the construction phase. This phase will not occur uniformly over the Project, but as prospective developers and future tenants perceive the value and demonstrate demand. At a particular point in time, one portion of YBC may be in the short-term period, while another may not enter that phase for several years. Subsequently, the long-term productivity of the area will be the on-going and viable elements in an urban setting, i.e., the convention center, office buildings and commercial/ retail outlets, hotel and associated commercial entertainment facilities as well as residential neighborhood.

Short-Term

- The relationship between the local short-term and long-term use of the Project means the commitment of land to permanent, primarily new, urban uses. These include dwelling units, offices, a convention center, and the like.

- The short-term uses will involve the construction of the long-term facilities. This construction will produce noise from construction activities, dust, dump trucks, earth-moving and grading equipment, etc. All of these activities will result in a short-term negative impact to the environment. There will be loss of surface soils during construction. Upon completion of these short-term activities these effects will be reduced and virtually eliminated.

- This short-term phase is also the period of high construction employment, which is the direct result of the construction activities. This is a significant cash flow positive impact on the labor market and the suppliers of building materials.

- The major short-term negative impact involving the loss of parking will be alleviated to a considerable extent over the long-term through the increased use of the various forms of public transportation facilities.

Long-Term

- The long-term productivity of the Project is the supply of various elements into a cohesive viable segment of the urban community. This product should be useful for no less than fifty years, although the commitment of land to urban uses is 40 years in the Urban Renewal Plan.

- There will be a long-term commitment and utilization of infrastructure elements such as water, energy, etc., to maintain the urban operations.

- There will be a long-term financial commitment by the City and County of San Francisco to provide the necessary support services to the urban development. These include police and fire protection, sewage disposal and treatment, solid waste pickup and other local government services.

- There will be a long-term commitment by the City and County of San Francisco to retire the bonds financing the convention center and to cover the center's operating losses (if any), from the designated portion of the hotel tax.

- There will be in project buildings and developmental terms a long-term financial commitment on the part of private financial institutions, the Department of Housing and Urban Development (FHA mortgage insurance), etc. Such commitments could become irretrieviable financial losses should foreclosure on any elements occur.

Relationship: Short-and Long Term

- The current uses within the Project area are older urban (although some new urban and residential development has occurred) and substantial market pressures exist for additional development. The short-term uses are the construction phases of development. Following the construction phase, the establishment and operation of the urban elements are the long-term uses. There are significant financial benefits in the short-run and these include construction financing, high labor employment and building materials sales. Some short-run negative environmental results occur in the form of noise, elimination of parking, dust and others related to construction. Basically, these short-term activities have little direct long-run consequences, except to the product created -- the final urban development.

The various long-term products of this urban development are weighted in terms of impactions to reach that result. The urban development is supported by economic demand, the City of San Francisco, labor unions, convention and tourist business interests, and Project developers. The impactions anticipated are not unusual in growth areas. The balance for approval appears in this study to be appropriate over anticipated impactions. Moreover, the long-term productivity of the urban development will be of significant use and value to all segments of the entire Bay Area.

The long-term benefits of the Project will flow from its developmental aspects as well as the already completed removal of the blighted building conditions that had previously existed in the area. These benefits, among others, included:

- An improved environmental setting, attractive to the newly (to be) created economic, social and commercial activity environment.

- There will be the preservation by rehabilitation or official documentation of historically valuable buildings in the Project.

- A special feature of the development includes a convention center — and its attendent benefits to the spectators, participants and induced monetary gains for local businesses.

- Employment in the new activity generators and the office buildings.

- The retrieval of previously undeveloped land.

- Much needed housing — both assisted and non-assisted for low, moderate and medium to upper medium income individuals, elderly and families.

- A delayed, but eventual tax benefit (over the pre-urban renewal tax level) to the City Treasury.

- Office and commercial buildings to provide space for such operations (also reducing and delaying conversion of other City areas for such construction).

Part XI: IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED

- The total 87-acre Yerba Buena Center Redevelopment Project area would remain committed to long-term urban uses and would not be retrievable until destruction of the structures or a change in Project uses. The Urban Renewal Plan will remain in effect until 2005.

- There would be a long-term public financial commitment on the part of local government to provide necessary services to support each stage of development. This includes such services as fire and police protection, health, welfare and educational services. In addition, other long-term local governmental commitments (some of which may be beneficial due to the current unemployment situation) include sewage disposal and ultimate treatment as well as solid waste pick-up and land fill sites for the storage or disposal of waste by-products. Local government financial commitment similarily covers the construction costs and long-term operation of the Convention Center.

- Natural resource uses associated with site preparation and construction will be utilized and irretrievably committed. These include such things as timber, cement, sand, gravel, etc., as well as manpower and energy needed before, during, and after construction. Materials, manpower and energy will also be expended for site grading, leveling, and/or filling. Potential salvage value after long-term utilization is not considered here.

- Long-term financial commitments in addition to those which have already been made, would be made by private financial institutions and possibly by the Department of Housing and Urban Development for mortgage insurance. Such commitments present irretrievable financial losses should foreclosures occur.

- Other public and orivate agency commitments to implement activities relating to their own interests. To the extent that local government can cause implementation of one or more of the Capital Improvement Projects in the Transportation Improvement Program - as articulated in the mitigation section of the Climate and Air Quality - the further degradation of Air Quality may not be completely irretrievable. Commitment of public transportation facilities to meet growing commuter needs and less dependence on private cars.

There would be an increased demand for fuel oil, natural gas, and electricity, which would consume dwindling supplies of basic energy sources. The increased demand for water could tax suppliers in drought years.

APPENDICES

APPENDIX A.

FEDERAL, STATE AND LOCAL AGENCIES FROM WHICH COMMENTS HAVE BEEN REQUESTED

Federal

Office of Architectural and
Environmental Preservation
Advisory Council on Historic
Preservation
1522 "K" Street NW, Suite 430
Washington, D. C. 20005

Office of the Secretary
Attention: Coordinator of
Environmental Quality Activities
U.S. Department of Agriculture
Washington, D. C. 20250

Executive Director of Civil Works
Office of the Chief of Engineers
U.S. Army Corps of Engineers
Washington, D. C. 20314

Environmental Resources Branch
South Pacific Division
U.S. Army Corps of Engineers
630 Sansome Street, Room 736
San Francisco, CA 94111

Office of Assistant General Manager
for Biomedical and Environmental
Research and Safety Programs
Atomic Energy Commission
Washington, D. C. 20545

Office of the Deputy Assistant
Secretary for Environmental Affairs
U. S. Department of Commerce
Washington, D. C. 20230

Office of the Assistant Secretary
for Defense (Health and Environment)
U.S. Department of Defense
The Pentagon, Room 3E172
Washington, D. C. 20301

Commission's Advisor on Environ-
mental Quality
Federal Power Commission
825 N. Capitol Street NE
Washington, D.C. 20426

Office of Environmental Affairs
Office of the Deputy Administrator
for Special Projects
General Service Administration
Washington, D. C. 20405

Office of Environmental Affairs
Office of the Assistant Secretary
for Administration and Management
U. S. Department of HEW
Washington, D. C. 20202

Director, Office of (10)
Environmental Project Review
U. S. Department of the Interior
Interior Building
Washington, D. C. 20240

Assistant Secretary for
Occupational Safety and Health
U.S. Department of Labor
Washington, D. C. 20210

U. S. Department of Labor
Attention: Environmental Officer
450 Golden Gate Avenue
San Francisco, CA 94102

Office of the Comptroller
National Aeronautics and
Space Administration
Washington, D. C. 20546

Regional Administrator IX (5)
U.S. Environmental Protection Agency
215 Fremont Street
San Francisco, CA 94105

Regional Environmental Officer
U.S. Department of HEW
50 Fulton Street
San Francisco, CA 94102

Region 9, Regional Administrator
Federal Highway Administration
Two Embarcadero Center, Suite 510
San Francisco, CA 94111

Office of the Director
Office of Economic Opportunity
1200 - 19th Street NW
Washington, D. C. 20506

Office of the Special Assistant to
the Secretary for Environ. Affairs
U.S. Department of State
Washington, D. C. 20520

Region IX Secretarial Representative
U.S. Department of Transportation
Two Embarcadero Center, Suite 610
San Francisco, CA 94111

Office of the Associate Director
Water Resources Council
2120 "L" Street NW, Suite 800
Washington, D. C. 20420

Mr. Max Cleland, Administrator
Veterans Administration
801 Vermont Avenue, NW
Washington, D. C. 20420

Mr. J. E. Mullen, Director
Veterans Administration
211 Main Street
San Francisco, CA 94105

Farmers Home Administration
Attention: Environmental Division
U.S. Department of Agriculture
459 Cleveland Street
Woodland, CA 95695

Office of Architecture and
Environmental Arts Program
National Endowment for the Arts
Washington, D. C. 20506

Office of the UMTA Representative, R9
Urban Mass Transportation Admin.
Two Embarcadero Center, Room 620
San Francisco, CA 94111

Mr. Charles Cope
Director, Federal Programs
National Association of Home Builders
15th and "M" Streets NW
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Office of Technical Support, HT
U.S. Dept. of Housing & Urban Development
451 Seventh Street SW
Washington, D.C. 20410

Robert C. Embry, Jr. (2)
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U.S. Dept. of Housing & Urban Development
451 Seventh Street SW, Room 7100
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Director, Division of (5)
Environmental Affairs
Energy Research and Development
Administration
Washington, D. C. 20545

Conservation & Environmental Division
Federal Energy Administration
111 Pine Street
San Francisco, CA 94101

Office of Energy Conservation
and Environment
Environmental Programs Division
Federal Energy Administration
12th Street & Pennsylvania Avenue NW
Washington, D. C. 20461

Farmers Home Administration
Attention: Environmental Division
U.S. Department of Agriculture
Washington, D. C. 20250

Document Service
Environmental Law Institute
1346 Connecticut Avenue
Washington, D. C. 20036

Director, Office of Federal
Activities (5)
(Mail Code A-104)
Environmental Protection Agency
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Washington, D. C. 20460

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Fish and Wildlife Service
U.S. Dept. of the Interior
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Portland, Oregon 97208

U. S. Dept. of Agriculture
Soils Conservation Service
5552 Clayton Road
Concord, CA 94521

STATE

State Clearinghouse (15)
Office of Planning & Research
1400 Tenth Street
Sacramento, CA 95814

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California Regional Water Quality
Control Board
3201 "S" Street
Sacramento, CA 95816

Mr. McMillan, District Engineer
California State Health Department
Water Sanitation Section
2151 Berkeley Way
Berkeley, CA 94704

State Attorney General's Office
Attention: Clem Shute
6000 State Building
350 McAllister Street
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P. O. Box 100
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1709 Eleventh Street
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Bay Area Air Pollution Control
District
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REGIONAL

Association of Bay Area Governments
Hotel Claremont (3)
Berkeley, CA 94705

Bay Area Rapid Transit District
800 Maddison Street
Oakland, CA 94607

Metropolitan Transportation Commission
Hotel Claremont
Berkeley, CA 94705

Golden Gate Bridge Highway and
Transportation District
Presidio Station
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Main Library - Civic Center
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Recreation & Park Department
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San Francisco, CA 94117

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California Academy of Sciences
Golden Gate Park
San Francisco, CA 94117

Mr. Ian McKibbin White
Director and Chief Curator
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The Fine Arts Museums of
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Legion of Honor Lincoln Park
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Sealer and Agriculture Commission
Department of Agriculture,
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San Francisco International Airport
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League of Women Voters
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254 Sutter Street
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Mr. John L. Friesbee III
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Documents Department
Civic Center
San Francisco, CA 94102

Hastings College of the Law Library
198 McAllister Street
San Francisco, CA 94102

Turner Construction
Attn: Richard Dorais
44 Montgomery
San Francisco, CA 94104

Stanle Smith
S. F. Building & Construction
Trade Council
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San Francisco, CA 94108

Chamber of Commerce
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San Francisco, CA 94104

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San Francisco, CA 94114

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Social Science, Business and
Ethnic Studies Library
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San Francisco State University
1600 Holloway Avenue
San Francisco, CA 94132

HOK
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110 - 5th Street
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San Francisco Museum of Art
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San Francisco, CA 94104

Consultants in Acoustics
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Jefferson Associates
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155 Montgomery Street, #808
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William H. Liskamm
P. O. Box 347
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Lord and LeBlanc
Attn: Bruce Lord/Lloyd LeBlanc
22 Battery Street, 5th Floor
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TJKM
Attn: Arnold Johnson
710 South Broadway, Suite 302
Walnut Creek, CA 94596

Systems Applications, Inc.
Attn: Phillip Roth
950 Northgate Drive
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San Francisco Police Department
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San Francisco Chapter
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Department of History
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Foundation for San Francisco's Architectural Heritage
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Urban Conservation Officer
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Energetics Science, Inc.
3030 Bridgeway
Sausalito, CA 94965

Ms. Patricia Hoar, Librarian
Bay Area Rapid Transit
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Senator S. I. Hayakawa
1390 Market St.
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San Francisco, CA 94102

Hon. Philip Burton
450 Golden Gate Ave.
San Francisco, CA 94102

APPENDIX B.

PROJECT BOUNDARIES

The Project comprises a portion of the South of Market Redevelopment Area D, which in Resolution No. 782-61 adopted by the Board of Supervisors of the City and County of San Francisco on December 11, 1961, and as amended in Resolution No. 132-63 adopted by the Board of Supervisors of the City and County of San Francisco on March 4, 1963, was designated and described as a blighted area, the redevelopment of which is necessary to effectuate the public purposes as set forth in the California Community Redevelopment Law. Project Area D-1 is indicated on the map, Project Area Boundaries, and is more particularly described as follows:

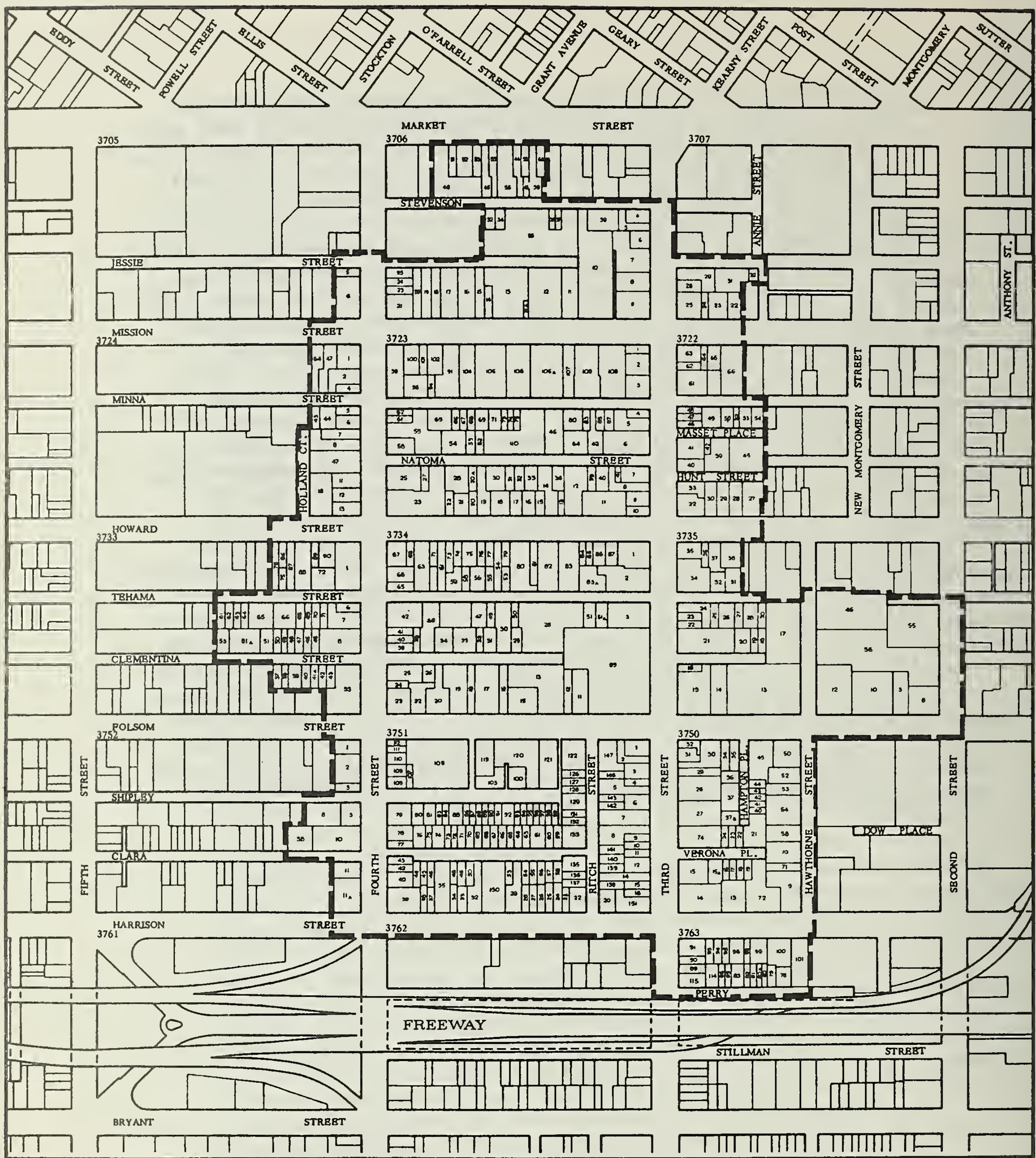
Beginning at the intersection of the most northeasterly line of Third Street with the most northwesterly line of Jessie Street; running thence northeasterly along said northwesterly line of Jessie Street 285.00 feet more or less to the intersection of said northwesterly line with the most northeasterly line of Annie Street; said northeasterly line being the northerly projection of said line as Annie Street now exists south of Jessie Street; thence southeasterly along said northeasterly line 86.00 feet more or less; thence at right angles southwesterly 30.00 feet more or less to a point on the southwesterly line of Annie Street; said point also being the most easterly corner of Lot 32 of Assessor's Block 3707 and the most northerly corner of Lot 21 of said Block 3707; running thence southwesterly along the property line of said Lots 32 and 21 32.45 feet more or less to a point; said point also being the most southerly corner of said Lot 32; thence southeasterly 1.00 foot more or less along the property line of Lots 21 and 31 of Assessor's Block 3707; thence southwesterly 23.542 feet more or less to the most westerly corner of Lot 21 of said Block 3707; thence southeasterly 119.00 feet more or less along the southwesterly property line of said Lot 21 to a point on the northwesterly line of Mission Street; thence northeasterly along said northwesterly line 7.25 feet more or less; thence at right angles southeasterly 82.50 feet more or less to a point on the southeasterly line of Mission Street; said point also being the most northerly corner of Lot 66 and the most westerly corner of Lot 67 of Assessor's Block 3722; thence continuing southeasterly along the property line of said Lots 66 and 67

160.00 feet more or less to a point on the northwesterly line of Minna Street; thence northeasterly along said northwesterly line of Minna Street 68.75 feet more or less to a point on said northwesterly line; said point also being the most easterly corner of Lot 67 and the most southerly corner of Lot 68 of Assessor's Block 3722; thence at right angles southeasterly 35.00 feet more or less to a point on the southeasterly line of Minna Street; said point also being the most northerly corner of Lot 54 and the most westerly corner of Lot 56 of Assessor's Block 3722; thence continuing southeasterly 300.00 feet more or less along the northeasterly property lines of Lot 54, the northeasterly terminus of Massett Place, Lot 45, the northeasterly terminus of Hunt Street, and Lot 27, all being a part of Assessor's Block 3722; thence southwesterly 18.00 feet more or less along the property line of Lots 27 and 26 of said Block 3722; thence southeasterly 55.00 feet more or less along the property line of said Lots 27 and 26 to a point on the northwesterly line of Howard Street; thence continuing southeasterly 82.50 feet more or less to a point on the southeasterly line of Howard Street; thence southwesterly along said southeasterly line of Howard Street 52.00 feet more or less to a point on said southeasterly line, said point also being the most northerly corner of Lot 38 and the most westerly corner of Lot 39 of Assessor's Block 3735; thence southeasterly 160.00 feet more or less along the northeasterly property lines of Lots 38 and 31 of said Block 3735 to a point on the northwesterly line of Tehama Street; thence northeasterly along said northwesterly line of Tehama Street 70.00 feet more or less to the northeasterly terminus of Tehama Street; thence southeasterly along said northeasterly terminus 35.00 feet more or less to a point on the southeasterly line of Tehama Street; said point also being the most westerly corner of Lot 17 and the most southerly corner of Lot 41 of Assessor's Block 3735; thence northeasterly 112.50 feet more or less along the property line of said Lots 17 and 41 to a point on the southwesterly line of Hawthorne Street; thence northwesterly along said southwesterly line of Hawthorne Street 34.583 feet more or less; thence at right angles northeasterly 50.00 feet more or less to a point on the northeasterly line of Hawthorne Street; said point also being the most westerly corner of Lot 46 and the most southerly line of Lot 47 of Assessor's Block 3735; thence continuing northeasterly along the property line of said Lots 46 and 47 112.50 feet more or less to a point; said point also being the most easterly corner of said Lot 47; thence southeasterly along the property line of Lots 46 and 5 of Assessor's Block 3735 4.583 feet more or less; said point also being the most southerly corner of Lot 5; thence northeasterly along the property line of said Lot 5 140.00 feet more or less to a point on the northwesterly line of Tehama Street; thence continuing along said northwesterly line of Tehama Street 217.50 feet more or less to the intersection of said northwesterly line with the northeasterly line of Second

Street; thence southeasterly along said northeasterly line of Second Street 467.50 feet more or less to the intersection of said northeasterly line with the most southeasterly line of Folsom Street; thence southwesterly along said southeasterly line of Folsom Street 470.00 feet more or less to the intersection of said southeasterly line with the intersection of the northeasterly line of Hawthorne Street; thence southeasterly along said northeasterly line of Hawthorne Street 632.50 feet more or less to a point on the southeasterly line of Harrison Street; thence southwesterly along said southeasterly line of Harrison Street 37.50 feet more or less to the most northerly corner of Lot 101 and the most westerly corner of Lot 105 of Assessor's Block 3763; thence southeasterly along the property line of said Lots 101 and 105 200.00 feet more or less to a point on the southeasterly line of Perry Street; thence southwesterly along said southeasterly line of Perry Street 482.50 feet more or less to a point on the southwesterly line of Third Street; thence northwesterly along said southwesterly line of Third Street 200.00 feet more or less to the intersection of said southwesterly line with the southeasterly line of Harrison Street; thence southwesterly along said southeasterly line of Harrison Street 987.50 feet more or less to a point on said southeasterly line; thence at right angles northwesterly across Harrison Street and along the property line between Lots 11, 11A, and Lot 12 of Assessor's Block 3752 242.50 feet more or less to a point on the southeasterly line of Clara Street; thence southwesterly along said southeasterly line of Clara Street 145.00 feet more or less to a point on said southeasterly line; thence at right angles northwesterly across Clara Street and along the property lines of Lots 6 and 38 of Assessor's Block 3752 115.00 feet more or less to a point, said point being the most westerly corner of said Lot 38; thence northeasterly along the property line of said Lot 38 60.00 feet more or less to the most easterly corner of Lot 7 of said Block 3752; thence northwesterly along the property line of Lots 7 and 8 of said Block 3752 and the northwesterly projection thereof 110.00 feet more or less to a point on the northwesterly line of Shipley Street; thence northeasterly along said northwesterly line of Shipley Street 90.00 feet more or less to the most southerly corner of Lot 3 of Assessor's Block 3752; thence northwesterly along the property line between Lots 1, 2, 3, and Lot 94 of said Block 3752 165.00 feet more or less to a point on the southeasterly line of Folsom Street; thence southwesterly along said southeasterly line of Folsom Street 30.00 feet more or less to a point on the said southeasterly line, said point being the southeasterly projection of the property line between Lots 13 and 14 of Assessor's Block 3733; thence at right angles northwesterly across Folsom Street and continuing along the property line of said Lots 13 and 14 162.50 feet more or less to the common corner of Lots 13, 14, 42, and 43 of said Block 3733; thence southwesterly along the property line between Lots 14, 16 and Lots 37, 38, 39, 41, 41A, and 42 170.00 feet more or less to the most southerly corner of Lot 37 of said Block 3733;

thence northwesterly along the property line between Lots 37 and 17 of said Block 3733 80.00 feet more or less to a point on the southeasterly line of Clementina Street; thence southwesterly along said southeasterly line of Clementina Street 175.00 feet more or less to a point on said southeasterly line, said point also being the southeasterly projection of the property line between Lots 53 and 54 of Assessor's Block 3733; thence northwesterly across Clementina Street and continuing along said property line of Lots 53 and 54 and continuing along the property lines of Lots 60A and 61 of said Block 3733 and the northwesterly projection thereof 235.00 feet more or less to a point on the northwesterly line of Tehama Street; thence northeasterly along said northwesterly line of Tehama Street 175.00 feet more or less to a point on said northwesterly line; said point also being the most southerly corner of Lot 76 and the most easterly corner of Lot 84 of Assessor's Block 3733; thence northwesterly along the property line of said Lots 76 and 84 and the northwesterly projection thereof 237.50 feet more or less to a point on the northwesterly line of Howard Street; thence northeasterly along said northwesterly line of Howard Street 75.00 feet more or less to the intersection of said northwesterly line with the southwesterly line of Holland Court; thence northwesterly along said southwesterly line 275.00 feet more or less to the intersection of said southwesterly line with the northwesterly line of Holland Court; thence northeasterly along said northwesterly line 50.00 feet more or less to the most southerly corner of Lot 43 of Assessor's Block 3724; said point also being the most easterly corner of Lot 16 of said Block 3724; thence northwesterly 357.50 feet more or less along the property line between said Lots 43 and 16 across Minna Street and continuing along the property line between Lots 63 and 64 of Block 3724 to a point on the northwesterly line of Mission Street; thence northeasterly along said northwesterly line 75.00 feet more or less to a point on said northwesterly line, said point being the most southerly corner of Lot 6 and the most easterly corner of Lot 7 of Assessor's Block 3705; thence northwesterly 200.00 feet more or less along the property line between Lots 5, 6, and 7 of said Block 3705 to a point on the northwesterly line of Jessie Street; thence along said northwesterly line 157.50 feet to a point on the northeasterly line of Fourth Street; thence southeasterly along said northeasterly line 10.00 feet to the point of intersection of said northeasterly line with the northwesterly line of Jessie Street; thence along said northwesterly line 275.00 feet more or less; thence northwesterly 5.00 feet more or less; thence northeasterly along said northwesterly line 30.00 feet more or less to a point on the said northwesterly line, said point being the most southerly corner of Lot 26 and the most easterly corner of Lot 28 of Assessor's Block 3706; thence northwesterly 80.00 feet more or less to the most westerly corner of said Lot 26; thence northeasterly along the property line of said Lot 26 5.00 feet more or less to the most

southerly corner of Lot 32 of said Block 3706; thence northwesterly along the property line of said Lot 32 70.00 feet more or less to a point on the southeasterly line of Stevenson Street; said point being the most westerly corner of said Lot 32 and the most northerly corner of Lot 28 of said Block 3706; thence southwesterly along said southeasterly line of Stevenson Street 160.00 feet more or less to a point on said southeasterly line, said point being on a line with the southeasterly projection of the property line between Lots 46 and 48 of said Block 3706; thence northwesterly across Stevenson Street and along said property line of Lots 46 and 48 205.00 feet more or less to a point on the southeasterly line of Market Street, said point also being the most westerly corner of said Lot 46 and the most northerly corner of said Lot 48; thence northeasterly along said southeasterly line 350.00 feet more or less to a point on said southeasterly line, said point also being the most westerly corner of Lot 61 and the most northerly corner of Lot 60 of said Block 3706; thence southeasterly 100.00 feet more or less along the property line between Lots 60 and 61 to the most easterly corner of said Lot 60; thence southwesterly 10.00 feet more or less along the property line between said Lots 60 and 61 to a point, said point also being the corner of Lots 59 and 61 of said Block 3706; thence southeasterly 70.00 feet more or less along the property line between said Lots 59 and 61 to a point on the northwesterly line of Stevenson Street; thence along said northwesterly line 417.50 feet more or less to the intersection of said northwesterly line with the northeasterly line of Third Street; thence southeasterly along said northeasterly line 174.00 feet more or less to the point of beginning.



YERBA BUENA CENTER

REDEVELOPMENT PROJECT AREA D-1

PROJECT AREA BOUNDARIES

PROJECT AREA BOUNDARY

3700 ASSESSOR'S BLOCK NUMBER

LOT NUMBER

0 FEET 200

N

SAN FRANCISCO REDEVELOPMENT AGENCY

APPENDIX C. COMPARATIVE USES AND FLOOR AREA, BY BLOCK AND PARCEL 1988 — YERBA BUENA CENTER

LEGEND APPENDIX C

x - Landsurface Area

TP - Temporary Parking

O - Office

RC - Retail commercial

CS - Community Service

VB - Vacant Building

V - Vacant Lot

PC - Pedestrian Concourse

CE - Commercial Entertainment

H - Hotel

CF - Convention Facility

P - Park

MDU - Market Dwelling Units

D - To be Demolished

DSP - Private Parking

DS - Downtown Support Service

PP - Public Parking

LI - Light Industry

EDU - Dwelling Units for Elderly

FDU - Dwelling Units for Families

		PRESENT LAND USE			DESIGNATED		
Block & Parcel #	Land Area	Use	Floor Area (sq.ft.)	Building Height (stories)	Use	Max. Floor Space (sq.ft.)	Building Height (stories)
Central Blocks							
CB-1 (3706)							
3706-1	25,890	TP	x	--	0 RC	600,000 80,000	36
3706-2	48,490	TP	x	--	0 RC	500,000 50,000	11
3706-4	80,720	TP	x	--	PC	x	--
3706-5	19,370	TP	x	--	0 RC	180,000 20,000	10
3706-6	15,435	0 RC	81,800 (vacant) 9,000	10	0 RC	81,800 9,000	10
3706-7	45,800	TP	x	--	0 RC	450,000 50,000	24-32
3706-8	16,720	VB	25,000 (vacant)	2	0 RC	10,000 15,000	2

		PRESENT LAND USE			DESIGNATED		
Block & Parcel #	Land Area	Use	Floor Area (sq.ft.)	Building Height (stories)	Use	Max. Floor Space (sq.ft.)	Building Height (stories)
Central Blocks							
3706-9	6,945	TP	x	--	O	55,450	7
					RC	14,000	
3706-13, 13A, 14	21,450	CS	Church & Rectory	3+1	CS	Church & Rectory	3+1
CB-2 3723	454,300	V	348,475x	--	O	796,950 (Lot A)	24-32
		TP	105,325x	--	RC	265,650 (Lot A)	2
					MDU	50 DUs (Lot A)	
					PC	82,500 (Lot B)	
					O	700,000 (Lot C)	24-32
					RC	40,000 (Lot C)	1
					CE	400,000 (Lot C)	4-6
					H	700 rooms (Lot C)	
CB-3 3734	454,300	V	118,449	--	CF	Convention Facility	Underground
		TP	335,851	--			

APPENDIX C. CONTINUED

Block & Parcel #	Land Area	PRESENT LAND USE: Use	PRESENT LAND USE: Floor Area (sq.ft.)	PRESENT LAND USE: Building Height (stories)	DESIGNATED: Use	DESIGNATED: Max. Floor Space (sq.ft.)	DESIGNATED: Building Height (stories)
Eastern Blocks							
EB-1 (3707)							
3707-A	31,840	O&RC	100,150[D]	3,3,2,+5	O RC	586,000 60,000	32-46
3707-B	964	O	7,000	5	O	7,000	5
3707-32	1,386	O&RC	13,000	5	O&RC	13,000	5
EB-2 (3722)							
3722-A	33,000	O&RC TP	48,000[D] 26,800[x]	2+7 --	O	669,000	32-46
3722-B	75,200 + 16,100	TP TP	x 25,630[D]	-- 2	O RC PP	618,400 20,000 (500 spaces)	 32-36 6-8
3722-27	7,260	O&RC	21,000	2	O&RC	21,000	2
EB-3(3735)							
3735-A	72,775	TP V	67,535[x] 5,240[x]	-- --	O	687,250	9

		PRESENT LAND USE			DESIGNATED		
Block & Parcel #	Land Area	Use	Floor Area (sq.ft.)	Building Height (stories)	Use	Max. Floor Space (sq.ft.)	Building Height (stories)
EB-3(3735)							
3735-C	8,075	RC	8,075[xD]	4	O	56,500	14
3735-9	6,750	DS	13,300	2	DS	13,300	2
3735-10	17,550	DS	46,800	3	DS	46,800	3
3735-12	16,950	O	104,300	5	O	104,300	5
3735-13, 14, 17	67,315	O	616,000	11	O	616,000	11
3735-15&16	16,800	DSP	16,800[x]	3	DSP	16,800[x]	3
3735-46	28,875	O	92,900		O	92,900	
			+			+	8
		DSP	34,800		DSP	34,800	
3735-55	21,384	O	19,800		O	19,800	
			+			+	2
		DSP	21,000		DSP	21,000	
3735-56	46,630	DSP	x	--	DSP	x	--

		PRESENT LAND USE			DESIGNATED		
Block & Parcel #	Land Area	Use	Floor Area (sq.ft.)	Building Height (stories)	Use	Max. Floor Space (sq.ft.)	Building Height (stories)
Southern Blocks							
SB-1 (3752)							
3752-A	3,600	V	x	--	LI	18,000	6
3752-B	12,000	CS DSP	17,600 + 3,000x	2	CS DSP	17,600 + 3,000x	2
3752-C	12,375	TP V	11,250x 1,125x	—	RC	61,900	5
3752-D	6,000	EDU	(278 DUs)	10	EDU	(278 DUs)	10
3752-2&3	8,775	LI DSP	7,750 1,875x	2	LI DSP	7,750 1,875x	2
3752-11	4,000	RC	10,000	2	RC	10,000	2
3752-11A	8,000	LI	17,600	2	LI	17,600	2

Block & Parcel #	Land Area	PRESENT LAND USE Use	Floor Area (sq.ft.)	Building Height (stories)	DESIGNATED Use	Max. Floor Space (sq.ft.)	Building Height (stories)
Southern Blocks							
SB-2 (3751)							
3751-A	90,066	O	400,000	7	O	400,000	7
3751-F, 105,112	40,870	O	168,000	6	O	168,000	6
3751-B	85,234	TP V	54,034x 23,200x 8,000x (street)	--	LI	426,000	5
3751-J	1,250	DSP	x	--	DSP	x	--
3751-K	1,600	V	x	--	DSP	x	--
3751-L	900	DSP	x	--	DSP	x	--
3751-N	2,000	DSP	x	--	DSP	x	--
3751-T	1,000	DSP	x	--	DSP	x	--
3751-P	16,764	TP	x	--	LI	83,800	5
3751-Q+R	48,000	V	x	--	EDU	140 DUS +70 spaces	8

Block & Parcel #	Land Area	PRESENT LAND USE Use	Floor Area (sq.ft.)	Building Height (stories)	DESIGNATED Use	Max. Floor Space (sq.ft.)	Building Height (stories)
3751-S	17,885	TP	x	—	LI	89,000	5
3751-H	36,720	V	x	--	EDU	200 DUs +50 spaces	9
3751-28	2,000	LI	2,600	2	LI	2,600	2
3751-29	6,400	LI	6,400	1	LI	6,400	1
3751-32	5,440	LI	2,600	2	LI	2,600	2
3751-33	2,560	LI	3,200	2	LI	3,200	2
3751-34	2,200	LI	2,800	2	LI	2,800	2
3751-78	4,080	LI	4,500	2	LI	4,500	2
3751-79	5,382	DS	10,500	2	DS	10,500	2
3751-150	12,000	LI O DSP	6,000 5,500 6,000x	2	LI O DSP	6,000 5,500 6,000x	2
SB-3 (3750)							
3750-A	57,750	V	x	--	LI	288,750	5

		PRESENT LAND USE			DESIGNATED		
Block & Parcel #	Land Area	Use	Floor Area (sq.ft.)	Building Height (stories)	Use	Max. Floor Space (sq.ft.)	Building Height (stories)
3750-B	9,945	TP	x	--	LI	50,000	5
3750-C	60,877	TP V	38,003^x 22,874^x	-- --	PP	760 spaces	--
3750-D	5,974	DSP	x	--	DSP	x	--
3750-9	8,908	O DSP	12,000 3,600^x	2	O DSP	12,000 3,600^x	2
3750-13	7,300	LI	9,025	2	LI	9,025	2
3750-14, 15,E	22,546	RC	x (gas station)	1	RC	x (gas station)	1
3750-45	10,100	LI	16,600	2	LI	16,600	2
3750-50	7,055	RC	12,800	2	RC	12,800	2
3750-53	4,294	LI	3,800	1	LI	3,800	1
3750-54	11,300	LI	19,800	2	LI	19,800	2
SB-4 (3763)							
3763-A,	35,175	TP	12,260^x	--	LI	121,900 +	
B+C		V	22,815^x	--	DSP	180 spaces	5

		PRESENT LAND USE			DESIGNATED		
Block & Parcel #	Land Area	Use	Floor Area (sq.ft.)	Building Height (stories)	Use	Max. Floor Space (sq.ft.)	Building Height (stories)
3763-93	2,000	LI	2,750	2	LI	2,750	2
3763-94	2,000	LI	2,750	2	LI	2,750	2
3763-95	2,000	LI	2,750	2	LI	2,750	2
3763-96	3,600	LI	4,000	2	LI	4,000	2
3763-99	4,640	LI	5,000	2	LI	5,000	2
3763-100	6,625	LI	8,375	2	LI	8,375	2
3763-101	8,000	LI	9,000	2	LI	9,000	2
Western Blocks							
WB-1 (3705)							
3705-A	9,750	CS	86,000	8	CS	86,000	8
3705-5	2,250	RC	5,500	2	RC	5,500	2
WB-2 (3724)							
3724-A	21,000	PP	100,800	5	PP	100,000	5

		PRESENT LAND USE			DESIGNATED		
Block & Parcel #	Land Area	Use	Floor Area (sq.ft.)	Building Height (stories)	Use	Max. Floor Space (sq.ft.)	Building Height (stories)
3724-B	43,562	VB RC TP V	11,250x 5,625x 23,915x 2,772x	7	O	304,900	7
3724-14	10,350	DS	28,350	2	DS	28,350	2
WB-3 (3733)							
3733-A	43,000	TP V VB	20,525x 10,725x 7,200	2	EDU	(182 DUs)	8
3733-C	64,071	EDU	(276 DUs)	13	EDU	(276 DUs)	13
3733-D	15,600	V	x	--	EDU	(90 DUs)	6
3733-8	10,400	CS	33,000	3	CS	33,000	3
3733-88	7,750	O	15,500	2	O	15,500	2
3733-93	14,800	RC	x (gas station)	1	RC	x (gas station)	1

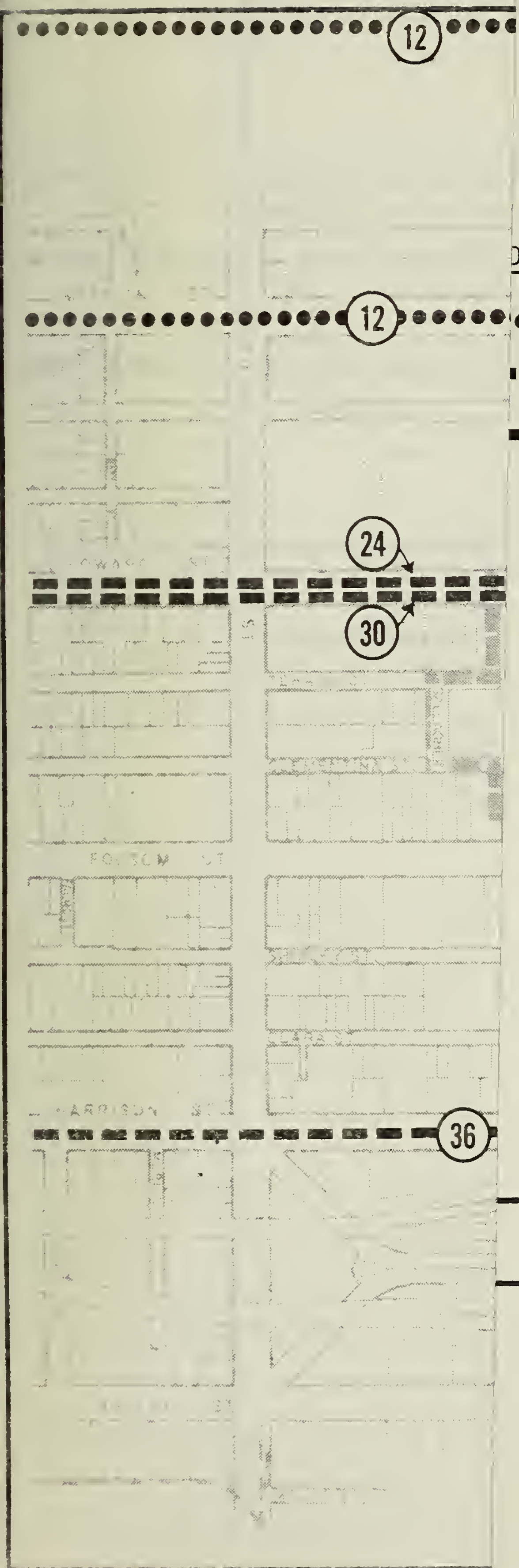
APPENDIX D: COMMUNITY SERVICES DETAILS

CONTENTS

Water Supply System

Water for San Francisco is moved from Crystal Springs and San Andreas Reservoirs to receiving in-City reservoirs. University Mound Reservoir, which serves YBC, is so situated that water can flow to it by gravity from Crystal Springs Reservoir, and from it by gravity throughout its entire service area along the lower elevations of the Financial District and the bayfront as far as the Marina.

The Redevelopment Area receives water via a group of four feeder mains located beneath the streets, shown in Figure D-1. Due to the "loop" system of interlocking mains, water to meet the urban needs in normal years is available on any street.



Feeder Water Mains (<20")*

Temporary Main

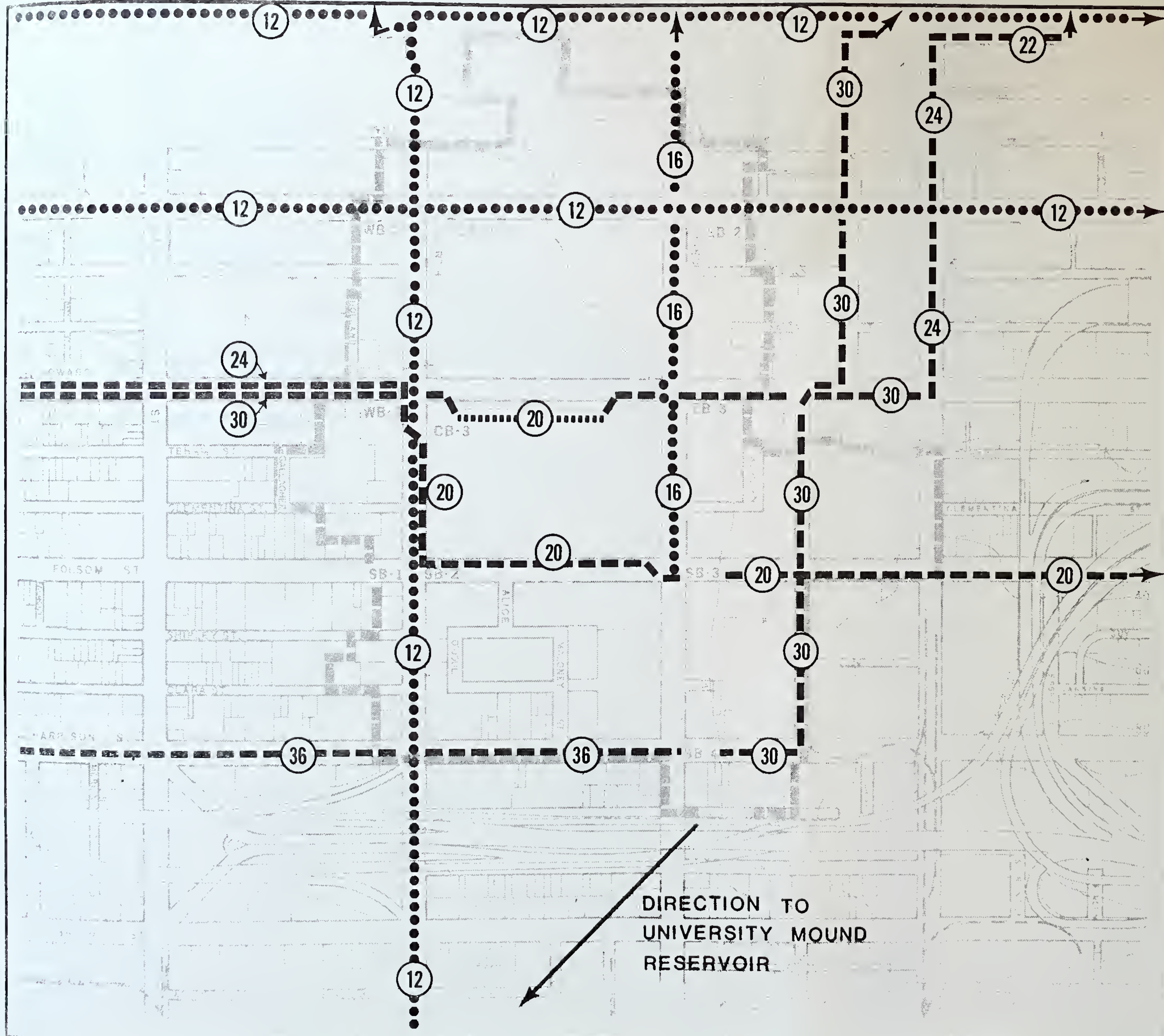
Feeder Water Mains (>20")

Diameter of Main, Inches

* Water Main System from
University Mound Reservoir

0.5
Kilometer
1800
Feet

FEEDER MAIN SYSTEM	D-1



LEGEND

Feeder Water Mains (<20")*

Temporary Main

Feeder Water Mains (>20")

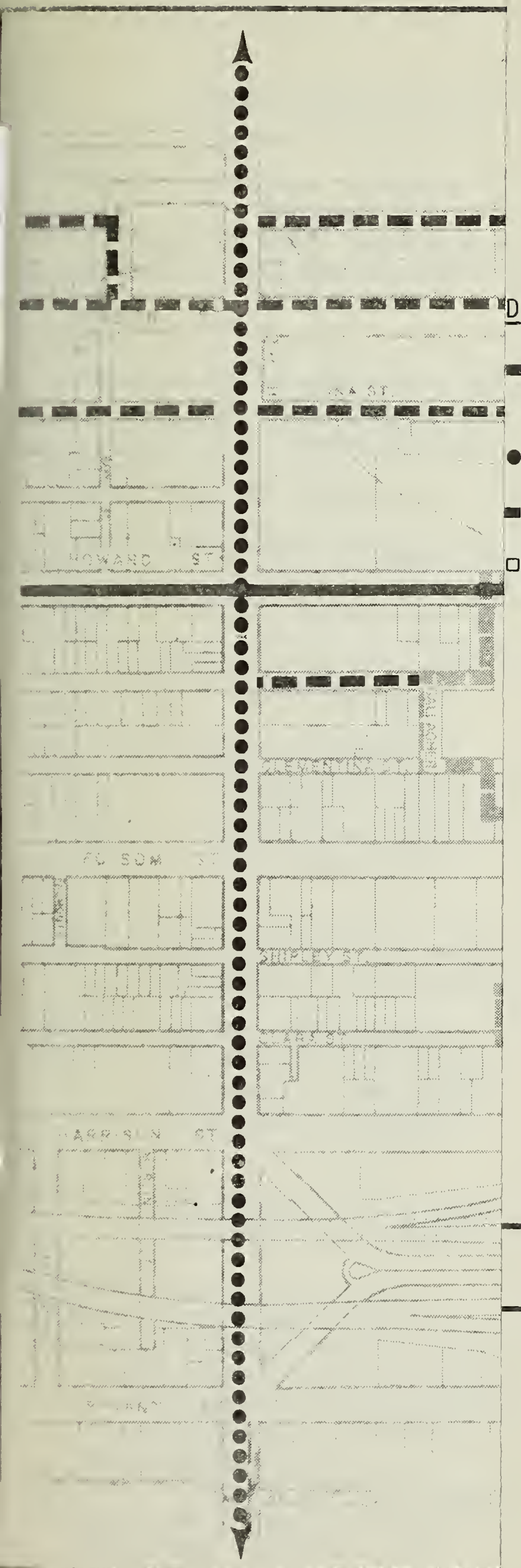
Diameter of Main, Inches

* Water Main System from
University Mound Reservoir

0 0.5
Kilometer

0 1800
Feet

FEEDER MAIN SYSTEM	D-1



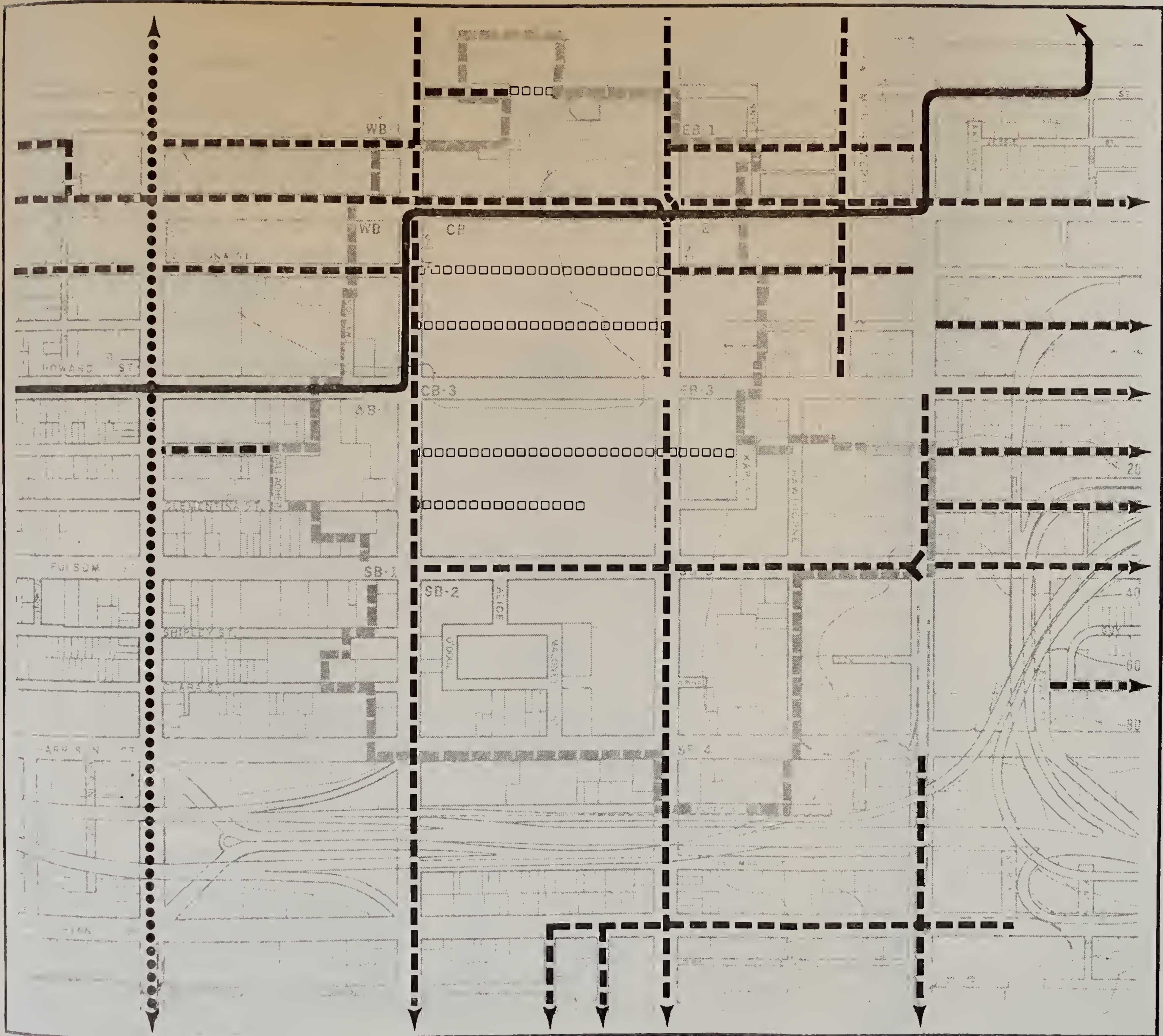
North Point Main, concrete, 8' diameter

Other concrete mains

Brick mains 3'x 5'

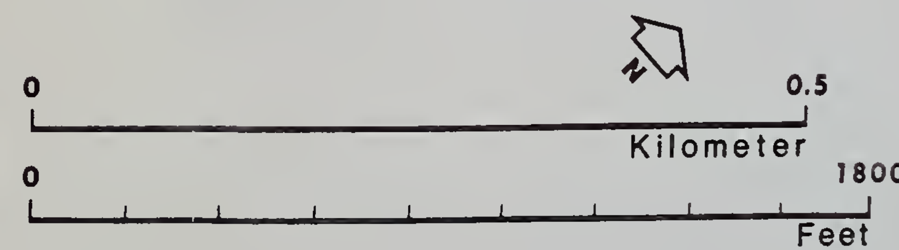
Mains under abandoned streets

SEWERAGE LINES	D-2



LEGEND

- North Point Main, concrete, 8' diameter
- Other concrete mains
- Brick mains 3'x 5'
- Mains under abandoned streets



SEWERAGE LINES	D-2

APPENDIX D, TABLE D-1
SEWAGE GENERATION CALCULATIONS FOR YBC: EXISTING AND COMMITTED

	Gallons/day	MGD/1/
Existing buildings remaining in 1981/2/	123,000	
Buildings now under construction:		
A.T. & T., 168,000 sq.ft./3/	11,500	
Gas Station/2/	700	
Downtown College Community Center 1,000 students (during a one-hour period) X 35 gpcd/4/	35,000	
TOTAL UNDER CONSTRUCTION:	47,200	0.047
TOTAL EXISTING AND NOW UNDER CONSTRUCTION:	170,200	0.170
1981 - COMMITTED CONSTRUCTION		
TODCO Housing 322 units X 100 gal/D.U./day/5/	32,200	
Mercantile Building		
9,000 sq.ft. retail-commercial X 200 gal/1,000 sq.ft./day/6/	1,800	
81,000 sq.ft. office X 125 gal/1,000 sq.ft./day	10,225	
	44,225	0.044
1981 - TOTAL EXISTING, NOW UNDER CONSTRUCTION, AND COMMITTED	214,400	0.214
1988 - COMMITTED CONSTRUCTION:		
1981 COMMITTED CONSTRUCTION	44,225	
TODCO Housing, 290 additional units X 100 gal/D.U./day/5/	29,000	
	73,225	0.073
1988 - TOTAL EXISTING, NOW UNDER CONSTRUCTION, AND COMMITTED	243,400	0.243

/1/Million gallons per day.
/2/From the records of the S.F. Water Dept. from June 1976 through May 1977.
/3/Based on sewage loads from the Pacific Telephone and Telegraph Buildings at 370 Third Street and 666 Folsom Street
/4/Joint Committee of the American Society of Civil Engineers and the Water Pollution Control Federation, Design and Construction of Sanitary and Storm Sewers, 1969.
/5/Based on sewage loads generated by Clementina Towers housing for the elderly.
/6/Brown and Caldwell, Report on Wastewater Loadings from Selected Redevelopment Areas, February, 1972.

TABLE F-2 CALCULATIONS FOR DESIGNATED AND PERMITTED USE SEWAGE GENERATION, YBC: 1988

Type of Land Use	Estimating Factors /1/	Designated Uses Unit	Designated Uses Gals/Day	Permitted Uses Unit	Permitted Uses Gals/Day
Office	125 gal/1000 sq ft/day	6,214,450	776,750		
Retail Commercial	200 gal/1000 sq ft/day	676,550	135,400		
Hotel Rooms	200 gal/room/day /3/	700 Rooms	140,000		
Convention Facility	5 gal/visitor/day /4/ 20 gal/employee/day	2700 v/d /5/ 800 emp/day	13,500 16,000		
Light Industrial	100 gal/1000 sq ft/day	1,077,450	107,700		
Commercial Ent.	100 gal/1000 sq ft/day	400,000	40,000		
Rec/Ent Park	5 gal/visitor/day	----	----	17,800 visitors/ day /6/	89,000
Housing	200 gal/DU/day /3/ 200 gal/DU/day /3/	---- 50 DU	---- 10,000	 900 DU	 180,000
TOTAL GALLONS PER DAY: TOTAL (mgd) /7/:			1,239,350 (1.24 mgd)		

/1/ Unless otherwise noted, taken from: Brown and Caldwell, Consulting Engineers, Report on Wastewater Loading from Selected Redevelopment Areas, February, 1972.
/2/ Combined office-retail commercial computed at 150 gall/1000 sq ft/day.
/3/ Metcalf and Eddy, Wastewater Engineering: Collection, Treatment, Disposal, McGraw-Hill, 1972.
/4/ Estimating factor of 5 gallons per visitor per day provided by convention center architects.
/5/ High annual attendance figure of 985,000 visitors based on total annual 1976 attendance of 973,000 at similar Los Angeles Convention Center and estimated convention-use-only attendance figure of 475,000 in 1988 provided by R. Sullivan, General Manager, San Francisco Visitors and Convention Bureau, telephone communication, August 22, 1977.
/6/ Based on high annual theme park attendance of 6,500,000 people estimated by R. Gryziec, letter dated July 26, 1977.
/7/ Million gallons per day

UNITS IN SQUARE FEET UNLESS OTHERWISE NOTED)

TABLE D-3 CALCULATIONS FOR DESIGNATED AND PERMITTED USE SOLID WASTE GENERATION, YBC: 1988

Type of Land Use	Estimating Factors /1/	Designated Uses Unit	Designated Uses Lbs/Day	Permitted Uses Unit	Permitted Uses Lbs/Day
Office	1 lb/100 sq ft/day	6,214,450	62,144		
Retail Commercial	1 lb/100 sq ft/day	676,550	6,765		
Pedestrian Concourse	0.4 lb/100 sq ft/day/2/	163,200	653		
Hotel Rooms	2.4 lb/room/day	700 Rooms	1,680		
Convention Center	1 lb/100 sq ft/day	370,000	3,700		
Light Industrial	2 lb/100 sq ft/day	1,077,450	21,459		
Park	0.4 lb/100 sq ft/day/2/	454,000	1,817		
Commercial Entertainment	1 lb/100 sq ft/day	400,000	4,000		
Rec/Entertainment Park	0.8 lb/visitor/day /2/			7,800 v/d /3/	14,240
Public & Downtown Spt. Pkg.	0.2 lb/100 sq ft/day		720	451,600	903
Housing	2.4 lbs/capita day x 2.25 capita/DU /4/	50 DU	270	900 DU	4,860
TOTAL: (lbs. per day)			103,298		
TOTAL: (tons per year)			18,850		

/1/ Unless otherwise noted, taken from California Solid Waste Management Board, Technical Information Service Bulletin No 2, Solid Waste Generation Factors in California, July, 1974.

/2/ Based on estimates of solid waste generation in Union Square, provided by F. Garbarino, Office Manager, Golden Gate Scavenger Company, telephone communication, August 23, 1977.

/3/ v/d = visitors per day. High theme park attendance figures provided by R. Gryziec in a letter dated July 26, 1977.

/4/ Occupancy factor of 2.25 person/DU provided by T. Conrad, Chief of Planning, Housing and Programming, S.F. Redevelopment Agency, telephone communication, August 17, 1977.

(UNITS IN SQUARE FEET UNLESS OTHERWISE NOTED)

APPENDIX D. MITIGATION: FIRE PROTECTION MEASURES TO BE INCORPORATED INTO THE DESIGN OF THE CONVENTION CENTER[1]

The following measures have been agreed to by the Fire Prevention Division and the convention center architects, although discussions are still in progress. The agreement would become a part of the building plans upon approval by the San Francisco Board of Examiners, and a judgment by the Board on any items in dispute.

- The building would be built of Type I, fire-resistant, construction materials.

- There would be a fire alarm system.

- A standby power supply on the premises would maintain power for lighting, fire alarm, voice communications, and sprinkler systems.

- An on-site fire brigade would be composed of trained employees.

- There would be a standpipe system in the building hooked directly into the domestic water supply system. A similar standpipe system would also be required on the site during construction. Full fire protection plans for the period of construction would be developed with the guidance of the Fire Department.[2]

- The building would be fully sprinklered from the domestic water supply. Were the sprinkler system to come on, or be disconnected, an alarm would be activated at an on-site control room. Whether the alarm would be activated also at a central station (private firm) is still under negotiation between the Fire Marshall and the architects.

- The sprinkler system in the main Exhibit Hall would be designed to provide 0.30 gallons per minute (gpm) per square foot over a 4,500 square foot design area.

- There would be a large on-site water supply of approximately 200,000 gallons for fire-fighting uses with pump on emergency power.[3]

- At least 50% of the Exhibit Hall exits would lead directly to the exterior of the building.

- At least four of the exits would be ramps. These would accomodate approximately 20% of the people in the main Exhibit Hall.

- Exhibits would not be allowed to block any exits, nor to interfere with the free flow of traffic to them.

- The building would be equipped with a smoke-removal system and the Fire Department would have the ability to control the exhaust and ventilation fans in this system.

- A central control station in the building would be provided for the exclusive use of the Fire Department while fighting a fire. It would be equipped with a communications system to each area of the convention center and a separate communications system for the use of the fire-fighting forces.

- Fuel for the emergency generator would be stored on the site.

- More exits from the main Exhibit Hall would be provided than are required by the Building Code.

APPENDIX D

1 All information except where noted, was supplied and reviewed by Charles W. Carli, Fire Marshal, San Francisco Fire Department, personal interview with ESA, August 12, 1977 and letter to ESA dated September 6, 1977.

2 Jean LaMarre, Project Director for Yerba Buena Center, Turner Construction Company, telephone conversation, September 7, 1977.

3 Mark Ostea, HOK, (Convention Center architects), telephone conversation, September 7, 1977.

TABLE 1. SUMMARY OF SAN FRANCISCO TEMPERATURE*

	Daily Maximum	Daily Minimum	Daily Average
January	54	45	50
February	59	50	54
March	57	47	52
April	64	50	57
May	62	50	56
June	68	52	60
July	64	52	58
August	61	52	57
September	67	55	61
October	68	53	61
November	59	51	55
December	56	47	52
Annual Average	62	50	56

*Degrees Fahrenheit

Source: Local Climatological Data, Annual Summary, U. S. Department of Commerce, 1973.

TABLE 2. SUMMARY OF SAN FRANCISCO PRECIPITATION, INCHES OF RAIN

	1974	1975	1976
January	3.40	2.57	.31
February	1.53	3.72	1.83
March	4.49	5.15	1.01
April	2.34	1.25	0.70
May	0.0	.02	0.01
June	.10	.04	.03
July	.62	.20	.00
August	0.0	.02	.78
September	0.0	.00	.51
October	.85	2.44	.38
November	.40	.43	1.04
December	1.53	.18	2.13
Annual Total	15.26	16.02	8.73*

*Note draught conditions exist for 1976 data.

Source: Climatological Data, Annual Summaries, National Oceanic and Atmospheric Administration, 1974, 1975, 1976.

BACKGROUND WIND DATA

Weather Bureau wind data taken from Goodridge, J. D., et at (April 1971) for stations located at San Francisco Airport (about 13 miles south of the site), locally at Potrero Hill (about 2 miles south of the site), and at Alameda (approximately 8 miles southeast of the site) indicate that predominant air flow in the San Francisco area is from a westerly direction. Generally, westerly winds flow from May through August. During rainy periods (November through March) winds generally flow from west, southwest and northwest directions. The predominant directions at San Francisco Airport generally are west-northwest and west, while the Potrero Hill winds shift to peak at southwest, and the Alameda station shows a predominant west direction with frequent winds from the northwest and southwest.

None of the Weather Bureau stations mentioned above can be considered to have wind patterns identical to those at the Yerba Buena site; further information is required.

Such information is available from an earlier study of regional wind patterns in the Bay Area: Bay Area Air Pollution Control District (June 1970), an information bulletin which reprints an earlier study (commonly referred to as the "Smalley Report") by the U. S. Weather Bureau and the California State Civil Defence Agency. In that study, surface winds throughout the Bay Area at 33 cooperating stations were measured at six-hour intervals during the period 1952-1955. From the measurements, typical regional airflow patterns were compiled.

Out of the analysis came 40 regional airflow patterns. The patterns were compiled into eight basic types, one for each of the major wind directions (compass points). In each of these basic types there were subtypes.

The patterns, or flow direction maps, show the general directions of the surface winds at various locations throughout the Bay Area 1/. On some, the directions at the Yerba Buena site are clearly indicated; on others, interpolation (estimation) between wind directions was required.

To apply the wind information in the Smalley Report to the Yerba Buena site it was necessary to examine each wind flow subtype and determine for that subtype the wind direction at the Yerba Buena site. Then, for each wind direction at the Yerba Buena site, each wind flow subtype producing that direction at the site was identified, and the frequencies of occurrence of the appropriate subtypes were evaluated. From these, the most frequent wind directions at the site were determined (Table 3A) 2/.

The Smalley Report also shows that often air is stagnant or nearly so, with no defined pattern of circulation. Such patterns are labeled as "light-variable" and are shown in Table 4.

TABLE 3A. OCCURRENCE OF PARTICULAR WIND DIRECTIONS IN THE VICINITY OF THE YERBA BUENA CENTER

Site Wind Direction (from compass point shown)	Annual Frequency %
N	1.4
NE	4.2
E	.5
SE	4.3
S	3.5
SW	7.0
W	36.5
NW	17.9
Annual Frequency of Winds	75.3%

Source: B.A.A.P.C.D., Information Bulletin, June 15, 1970, "A Study of Air Flow Patterns in the San Francisco Bay Area" (Smalley Report).

TABLE 3B. WIND SPEED AND DIRECTION, SAN FRANCISCO FEDERAL OFFICE BUILDING, 1973

MONTH	MEAN SPEED (MPH)	PREVAILING DIRECTION
January	6.7	N
February	7.5	W
March	8.5	W
April	9.5	W
May	10.4	W
June	10.9	W
July	11.2	W
August	10.5	W
September	9.1	W
October	7.6	W
November	6.3	W
December	6.5	N
Year Average	8.7 m.p.h.	

SOURCE: U. S. Department of Commerce, 1973, National Oceanographic and Atmospheric Agency, Local Climatological Data, San Francisco, California, 1973.

TABLE 4. PREVALENCE OF STAGNANT OR "LIGHT-VARIABLE" CIRCULATION PATTERNS IN THE SAN FRANCISCO BAY AREA, 1952-1955 (PERCENTAGE OCCURRENCE)

Month	Time period				
	4 a.m.	10 a.m.	4 p.m.	10 p.m.	All Periods
January	39%	32%	30%	35%	34%
February	41	29	20	43	33
March	31	30	4	26	23
April	33	19	1	13	16
May	31	14	2	14	15
June	17	7	0	6	7
July	12	5	0	4	5
August	9	15	0	4	7
September	38	38	2	22	22
October	52	39	5	34	32
November	58	44	23	51	44
December	35	27	22	31	29
Annual Average	33%	24%	9%	24%	22%*

*Light/Variable wind percentages were rounded; therefore, when added to the annual wind frequency (Table 3-A), they do not total 100%.

Source: B.A.A.P.C.D., Information Bulletin, June 15, 1970, "A Study of Air Flow Patterns in the San Francisco Bay Area" (Smalley Report).

TABLE 5. TREND OF AVERAGE HIGH HOUR OXIDANT* CONCENTRATIONS 1962-1976

	San Francisco	District Average
1962	.11 ppm	.09
1963	.09	.10
1964	.12	.10
1965	.07	.10
1966	.06	.08
1967	.06	.085
1968	.035	.08
1969	.03	.085
1970	.05	.08
1971	.04	.065
1972	.025	.06
1973	.03	.065
1974	.04	.07
1975	.02	.07
1976	.04	.06

*Ozone, a measure of photochemical smog.

Source: Environmental Management Task Force, Air Quality Maintenance Plan, Technical Memo #3, March 1977.

TABLE 6

1975 SAN FRANCISCO Annual Average Emissions (Tons/Day)	PART	ORG	NOX	SO2	CO
PETROLEUM REFINING					
Refining Processes	—	—	—	—	—
Other processes	—	—	—	—	—
Combustion for Heat	—	—	—	—	—
Storage & Blending	—	—	—	—	—
Marine Loading	—	—	—	—	—
Upsets, Breakdowns, Flaring	—	—	—	—	—
CHEMICAL					
Nitric Acid	—	—	—	—	—
Sulfur	—	—	—	—	—
Sulfuric Acid	—	—	—	—	—
Other Chemical	0.6	0.5	—	—	—
OTHER INDUSTRIAL/COMMERCIAL					
Pulp and Paper	—	—	—	—	—
Metallurgical	—	—	—	—	—
Mineral	3.6	—	—	—	—
Other Processes	4.6	1.6	—	—	—
ORGANIC COMPOUNDS EVAPORATION					
Storage Tanks	—	2.4	—	—	—
Coating Operations	—	19	—	—	—
Degreasers	—	6	—	—	—
Dry Cleaners	—	2	—	—	—
Rubber, Plastic Product Mfg	—	6.4	—	—	—
Other Organics Evaporation	—	4.7	—	—	—
GASOLINE MARKETING					
Bulk Loading Plants	—	—	—	—	—
Service Stations - Spillage	—	0.4	—	—	—
- Underground Tanks	—	0.7	—	—	—
- Filling Auto Tanks	—	3.8	—	—	—
COMBUSTION OF FUELS					
Domestic	0.7	—	3.4	—	0.2
Commercial & Institutional	0.3	—	1.4	—	0.1
Utilities - Power Plants	0.8	0.1	9.7	3.7	—
Other Industrial	0.1	0.1	1.5	0.3	0.3
BURNING OF MATERIALS					
Incineration	0.2	0.4	0.1	—	1.1
Agricultural Open Burning	—	0.1	—	—	0.1
Accidental Fires	1.4	1.9	0.1	—	6.1
OFF-HIGHWAY MOBILE SOURCES					
Agricultural Tractors	—	—	—	—	—
Construction Equipment	0.4	1	5.4	0.7	14
Ships	0.3	0.6	2.2	8	0.3
Locomotives	0.1	0.2	0.7	0.1	0.3
Other Engines	0.1	4.6	0.3	—	19
TOTAL (DISTRICT JURISDICTION)	13	57	25	13	42
AIRCRAFT					
Air Carriers	—	—	—	—	—
General Aviation	—	—	—	—	—
Military	—	—	—	—	—
MOTOR VEHICLES					
Cars and Light Duty Trucks	3.9	34	27	1	260
Heavy Duty Trucks	0.6	12	7	0.8	65
Buses	—	0.2	0.7	0.1	0.9
Motorcycles	—	0.8	—	—	2.1
GRAND TOTAL	18	100	59	15	370

Footnotes

1/ At a given location, the wind direction can be different, by 90 degrees or more, from the nominal subtype wind direction.

2/ Wind speed and direction information based on measurements in 1973 at the Federal Office Building (San Francisco Civic Center area) is presented in Table 3-B.

APPENDIX F. CLIMATE AND AIR QUALITY DATA AND METHODOLOGY

TABLE 1. MAJOR LINE SOURCES IN ONE KILOMETER SQUARE AREA

East/West Line Sources

Market Street - Fifth to First*
Mission Street - Fifth to First*
Howard Street - Fifth to First*
Folsom Street - Fifth to First*
Harrison Street - Fifth to First*
Bryant Street - Fifth to First*
James Lick Freeway

North/South Line Sources

Fifth Street - Market to Bryant
Fourth Street - Market to Bryant
Third Street - Market to Bryant
Hawthorne Street - Howard to Harrison
New Montgomery Street - Market to Howard
Second Street - Market to Bryant
First Street - Market to Bryant*

*Although First Street is not within the one-kilometer square area, traffic volume estimates used in the air quality analysis include the pertinent segments of all east/west links from First Street to Fifth Street (that is, including the segment from the eastern boundary of the square to Second Street for each major east-west Street).

TABLE 2. STATIONARY SOURCE EMISSIONS USE TYPES

Stationary Source Emissions, Generalized Land Use Categories.

Residential:	Hotel Rooms Market Housing Elderly Housing Family Housing
Commercial:	Retail Commercial Commercial Entertainment
Office:	Office Community Service Downtown Support Service
Light Industry:	No Breakdown
Convention Center:	No Breakdown Needed
Recreation/Entertainment Park:	No fuel-combustion emissions--all electric. (Modeled after Tivoli Gardens).

Photochemical Oxidant Formation Analysis

The following descriptive material is abstracted from the SAI report 1/ prepared for the San Francisco Redevelopment Agency's EIR, with minor editorial changes.

The National Ambient Air Quality Standard (NAAQS) for oxidant is a regional standard; namely, the oxidant concentration shall not exceed 0.08 parts per million (ppm) for one hour anywhere in a control region more than once per year. The standard is not designed for application to point sources because atmospheric oxidants (primarily, and hereinafter, "ozone") are not emitted directly: ozone is formed primarily by atmospheric reactions involving sunlight, hydrocarbons (HC), and nitrogen oxides (NO_x). The emissions that are the most significant precursors of ozone are HC and nitric oxide (NO) (emissions contain on the order of 10% of nitrogen dioxide (NO_2). Motor vehicle exhaust is the most important source of these precursors in the Bay Area, accounting for roughly three-fifths of all NO and one-half of all HC. Motor vehicle exhaust is currently the largest source of emissions at the YBC site.

The basic elements of the current understanding of photochemical ozone formation are discussed in the following. The chemistry of the nitrogen oxides is important in understanding the relationship between calculated concentrations of NO_x and standards for NO_2, as well as the smog-formation process. Similarly, the chemistry of HC and NO_x demonstrates why smog formation is not proportional to either HC or NO production.

- Various mechanisms oxidize NO to NO_2. A major mechanism involves the breakdown of HC in sunlight to form compounds that react with NO.

- NO_2 is photolyzed by sunlight to form ozone (O_3) and NO. In a reverse reaction, NO can react with O_3 to form NO_2 and O_2. Thus, the higher the ratio of NO_2 to NO, the greater the net ozone production.

- By converting NO to NO_2 without using up ozone, HC greatly increases the net production of ozone.

These reactions are such that peak ozone concentrations usually occur several hours after the HC and NO_x are emitted. By that time, the pollutants may have been carried tens of miles by the wind and mixed by atmospheric turbulence with gases from many other sources.

In ozone formation, the proportions of HC and NO are important. HC in excess of that required to oxidize the NO present contributes little to producing ozone. Similarly, NO beyond the amount that can be oxidized to NO_2 and can produce ozone. A sufficient excess of either precursor can lead to reduced ozone concentrations. Precursor materials that do not result in ozone formation while the air mass is still in the urban region may contribute to elevated background concentrations at later times in downwind locations.

Production of ozone at levels that cause concern depends on the presence of HC and NO_X precursors at high concentrations in bright sunlight for a few hours. Since turbulent eddies are generated in the atmosphere by surfaces heated by sunlight, intense sunlight tends to promote mixing, dilution, and dispersion of pollutants. Thus, during the course of a day, the conditions that favor ozone production may be self-limiting.

Denver, Colorado Land Use Sensitivity Analysis. The conclusions of the SAI Denver study (sensitivity to uncertainties in urban growth), as they apply to YBC, are summarized in the text. The basis for those conclusions is presented here. SAI recently completed a study of the air quality impacts of the urban development anticipated in the Denver metropolitan region 2/. Denver's smog (ozone)levels were predicted on the basis of forecasts of urban growth patterns supplied by local agencies. The results had uncertainties because of uncertainties in input data as well as model inadequacy. These uncertainties were determined separately by tests of the sensitivity of results to variations in emissions input and comparison of the results with observational data. It is the sensitivity testing that applies to the YBC predictions.

The Denver metropolitan region consists of a central city and a ring of suburbs. The region has a population of about 1.3 million, which is projected to reach 2.35 million by the year 2000. As might be expected, most of the population growth is anticipated in the suburban ring.

To test the sensitivity of ozone forecasts to variations in growth patterns, SAI performed model simulations of ozone formation in the year 2000 from predicted emissions (the "base case") and also from several alternative emission patterns. All winds, turbulence, and other physical conditions were unchanged in these simulations.

Each alternative simulated a redistribution of population in which the emissions in a given subregion (30 75 sq. mi.) were reduced by 25% and emissions in all other subregions increased proportionally so as to maintain the same total emissions in the region. A final alternative was a reduction in the emissions in the City of Denver with a similar redistribution. In this case the emissions were reduced 17.5%, which made them equivalent to 1976 emissions in Denver. Thus, eight model simulations were carried out:

1. Base case: year 2000 emissions (28 July 1976 meteorology used in calculating ozone concentrations).

2-7 Emissions in Subregions 1-6 reduced 25% each (one at a time, with no other changes in each simulation).

3. Emissions in Denver reduced 17.5%.

Perturbations (emission reductions) in each subregion were simulated separately to determine whether the position of the perturbation relative to the wind trajectory through downtown Denver affected peak ozone concentrations. That is, did it matter if the upwind, or off-path emissions were changed?

The simulations were carried out with SAI's Denver Model, a photochemical model that computes the concentrations of various pollutants, including ozone, in two-mile by two-mile grid squares at each hour of the day, given hourly values of emissions and meteorological variables.

The meteorology chosen for the sensitivity study was that of 28 July 1976. For that date and 1976 emissions, the Denver Model predicted a region-wide maximum one-hour-average ozone concentration of 20 parts per hundred million (pphm) between 3 and 4 p.m. For the emissions inventory for the year 2000 and the same meteorology (Case 1), the Denver Model predicted a maximum one-hour-average of 10 pphm between 2 and 3 p.m. For the other seven sensitivity runs listed above, no difference was found in either the location, time, or magnitude of this maximum. In fact, the differences among the eight runs in terms of predicted ozone concentrations were confined at all times of the day to at most a difference of 1 pphm in one or two grid squares.

Concentration differences should depend on the location of the emissions reduction area with respect to the region-wide emissions patterns for any given mean wind direction. The maximum changes in the sensitivity study of the Denver Model were too small, however to identify any such effect. In other words, all seven perturbations of the base case emissions inventory resulted in essentially identical predictions for ozone concentrations in the Denver region. This result is ascribed to the time factor in ozone production: by the time that significant amounts of ozone have been formed, the emissions are too well mixed to reflect their origins. Furthermore, the region-wide emissions were not changed in this exercise and in spite of the rather drastic imposition of growth controls that emissions reductions of up to 25% would imply, no more than 7% of the total regional emissions were redistributed. Thus, it is apparent that these changes in the spatial distribution of emissions have no effect on ozone concentrations. From this one may infer that land use controls that would reduce the population of any subregion by as much as 25% without changing the regional population would be ineffective in terms of reducing ozone concentrations.

Each of the alternative cases in the Denver study represents changes in emissions equivalent to the displacement of 50,000 to 100,000 people from an area of 30 to 75 sq. mi. The displacement of this population represents a much more massive perturbation in emissions and land use than any of the various plans for developing YBC or even a go/no-go decision for YBC. No statistically significant effect would be produced in ozone air quality in Denver by such perturbations; it seems clear that the much smaller perturbation in YBC could not produce a calculable or measurable change in ozone concentrations in the Bay Area.

This is not to say that full buildout of YBC would not increase smog levels in the Bay Area; commute trips might add emissions that are not now occurring. The Denver study does prove that it is impossible to calculate the smog-forming impacts of YBC, with respect to "where" and "how much."

SAI Photochemical Modeling Exercise for YBC. A trajectory model was used in this computer simulation, carried out as part of the S.F.R.A. EIR effort. The model performs the same photochemical reaction analysis as a grid model but examines only those grid locations along the trajectory (wind "path") of the reactive pollutant plume passing through the YBC site. For the sensitivity analysis, YBC site mobile-source emissions at full development for the Project were used, as were the Base Year 1988 emissions. The inputs for the SAI analysis included traffic data provided by TJKM for the YBC area (1-km square).

Analysis of ozone formation was conducted for two trajectories passing through downtown San Francisco in the vicinity of the YBC site, one traversing the Bay and proceeding eastward over Oakland and into Livermore, the other moving southeastward over portions of the Bay and into San Jose. It was therefore necessary to estimate emissions along trajectories from YBC down the shore of San Francisco Bay to San Jose and from YBC across the Oakland hills to Livermore.

Traffic volumes and speeds for the years 1980 and 1988 were those used in the body of the EIS. These traffic data were used to estimate the hourly vehicle miles traveled (VMT) within the 1-km square for the morning peak traffic period (6-9 a.m.). Because automobile emissions depend on vehicle speed, separate VMT estimates were made for each average speed of vehicle operation.

Emission factors for an "average" California vehicle at various operating speeds were estimated using a modified program, written to estimate emission factors in accordance with EPA recommendations 3/, and subject to the assumptions regarding federal motor vehicle regulations outlined in that reference. Delays of a number of years in meeting the original deadlines assumed in that reference (and non-correction for Supplement 8 changes) would cause an error within the limits of accuracy of this sensitivity analysis. That is, the conclusions of the sensitivity analysis are unaffected by such input errors.

The distribution by class of vehicles operating in San Francisco was assumed to be 76% light duty gasoline vehicles, 21% light duty gasoline trucks, 1.6% heavy duty gasoline vehicles, and 0.7% heavy duty diesel vehicles. The distribution of light duty vehicles by model year was derived from data provided by BAAPCD. The annual distance traveled for each model year was assumed to be the same as the national average 3/. All vehicle age distributions and annual vehicle mileage distributions for heavy duty vehicles were assumed to be the same as the national average. 3/ NO_X emissions were assumed to be 95% NO and 5% NO_2.

The data on average emissions were combined with the data on average speeds on various streets and the data on morning peak hourly VMT to obtain the hourly emissions of pollutants in the morning rush hour.

For the trajectory model analysis, emissions of NO_X and hydrocarbons from ground sources on the trajectories of interest were calculated from contour plots of the rates of emission of these pollutants 4/. The meteorology assumed for the analysis is presented in the SAI report 1/.

Because the photochemical modeling study was intended to examine the sensitivity of Bay Area ozone patterns to YBC emissions, rather than to predict absolute concentrations, the use of SAI's full scale grid model was not deemed appropriate. The trajectory model used includes the same photo-chemical reaction computation package as the grid model but does not carry out the computations for all grid locations. Only grid locations along the trajectory (wind "path") passing through the YBC site are considered.

The model was applied to two trajectories: one on a straight-line path from YBC to Livermore, the other on a straight-line path to San Jose. A portion of the YBC-San Jose trajectory is over the Bay, where emissions are very low. Thus, a larger fraction of the pollution arriving at San Jose via this trajectory would come from YBC than would be the case for a trajectory that followed the Bay shore. Three computer runs were made for each trajectory. The first run was made with the project 1988 emissions and with emissions at every other grid point on the trajectory set to the corresponding regional emissions in 1977, corrected for continuing implementation of automobile emission controls. (Regional geographical emissions forecasts for 1980 and 1988 were not available.) In the second run, the emissions at the grid point corresponding to the YBC site were reduced by an amount equal to the maximum difference in emissions between the project in 1988 and Base Year 1988 (in fact, by the 1988 project increment). The objective of the second run was to determine whether a calculable change in oxidant/ozone concentrations at Livermore or San Jose would result from the maximum change in pollutant emissions at the YBC site that could occur because of development. A third run was then made in which emissions at the grid point corresponding to the YBC site were reduced by twice the reduction of the second run. The objective of the third run was to assess the impact on the results of any errors in emissions estimates.

The results of the first run for each trajectory are presented in Figures 1 through 4 (computer printouts). Figure 1 presents the predicted concentration of NO_2, plotted versus the time from the start of the simulation, for the San Francisco to Livermore trajectory. The concentrations are those at the points on the trajectory that the YBC-originating parcel would reach at the indicated times. Since all simulations were begun at 0500, the time corresponding to any point on the curve may be obtained by adding 0500 hours to the time from the start of the simulation. Thus, Figure 1 indicates that the simulation ended at approximately 1900 hours and the concentration of NO_2 (at Livermore) was then roughly 0.065 ppm. Figure 2 presents the corresponding curve for Livermore-trajectory ozone (O_3) concentrations, and Figures 3 and 4 are the curves for the San Francisco to San Jose trajectory. These figures indicate that the model predicts an ozone concentration of about 0.125 ppm in the vicinity of Livermore and about 0.095 ppm in the vicinity of San Jose for the conditions under which the simulation was carried out. The corresponding concentrations of NO_2 are about 0.065 ppm at Livermore and 0.075 ppm at San Jose. The NO_2 concentration in the trajectory passing over San Jose has a distinct rise as the air parcel approaches the city, corresponding to increased NO_X emissions there (see Figure 3). The reaction of the emitted NO_X with ozone results in a somewhat depleted ozone concentration in the vicinity of San Jose, which is shown in Figure 4.

For purposes of comparison, the concentrations predicted at Livermore and San Jose are shown in Table 3. The table shows that a "YBC-size" reduction in the emissions reduces ozone and nitrogen dioxide concentrations by no more than one part per billion (ppb). One ppb is below the expected accuracy limits of the computation. The data indicate that downwind ozone and nitrogen dioxide concentrations would not be sensitive to the changes in the emissions at the YBC site which may be brought about by the project.

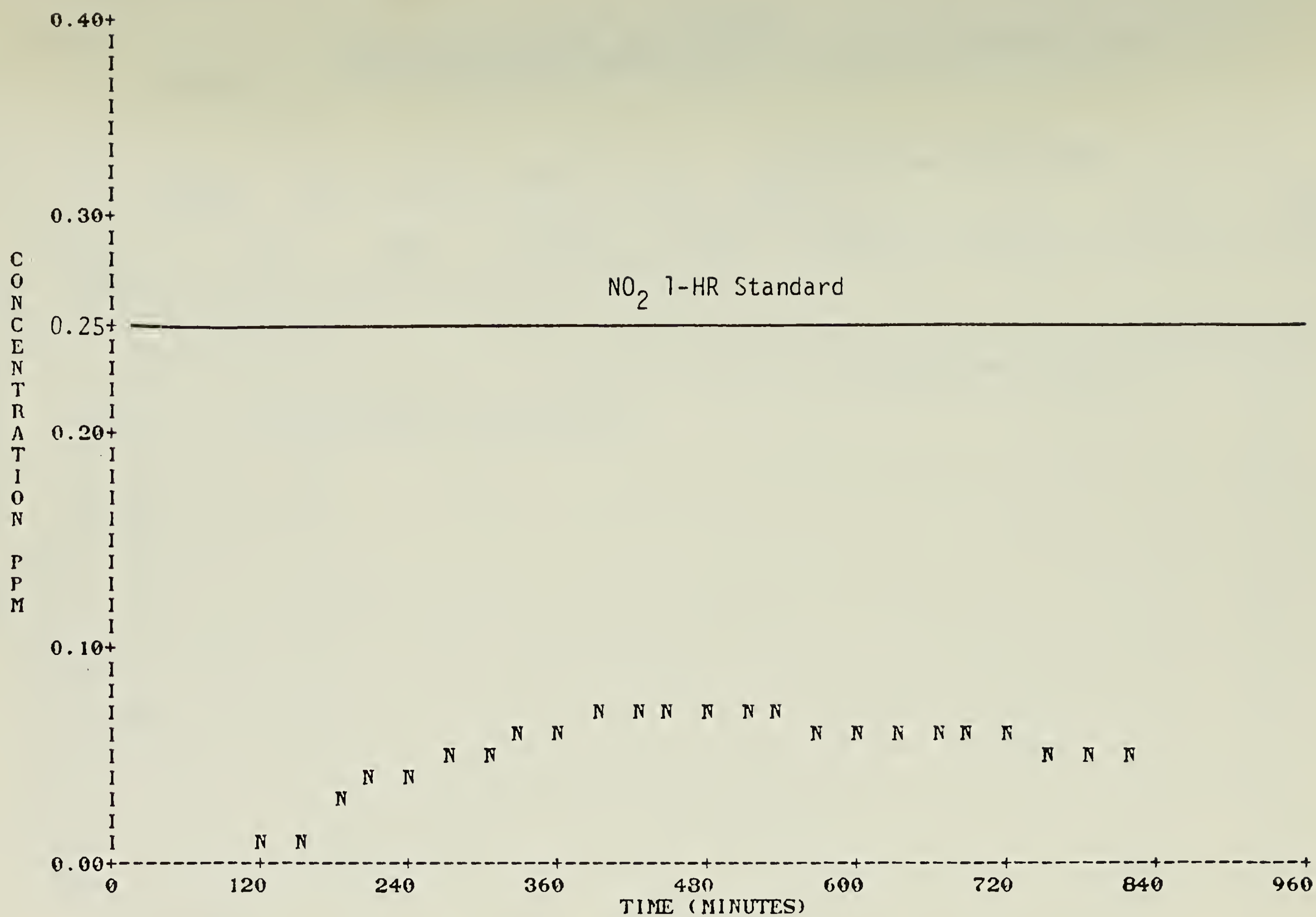


FIGURE . YB -- SF-LIV. SPECIES NO2 CONCENTRATION SCALE FACTOR 1

FIGURE 1. NO_2 CONCENTRATIONS PREDICTED BY THE TRAJECTORY MODEL FOR THE TRAJECTORY FROM YBC TO LIVERMORE

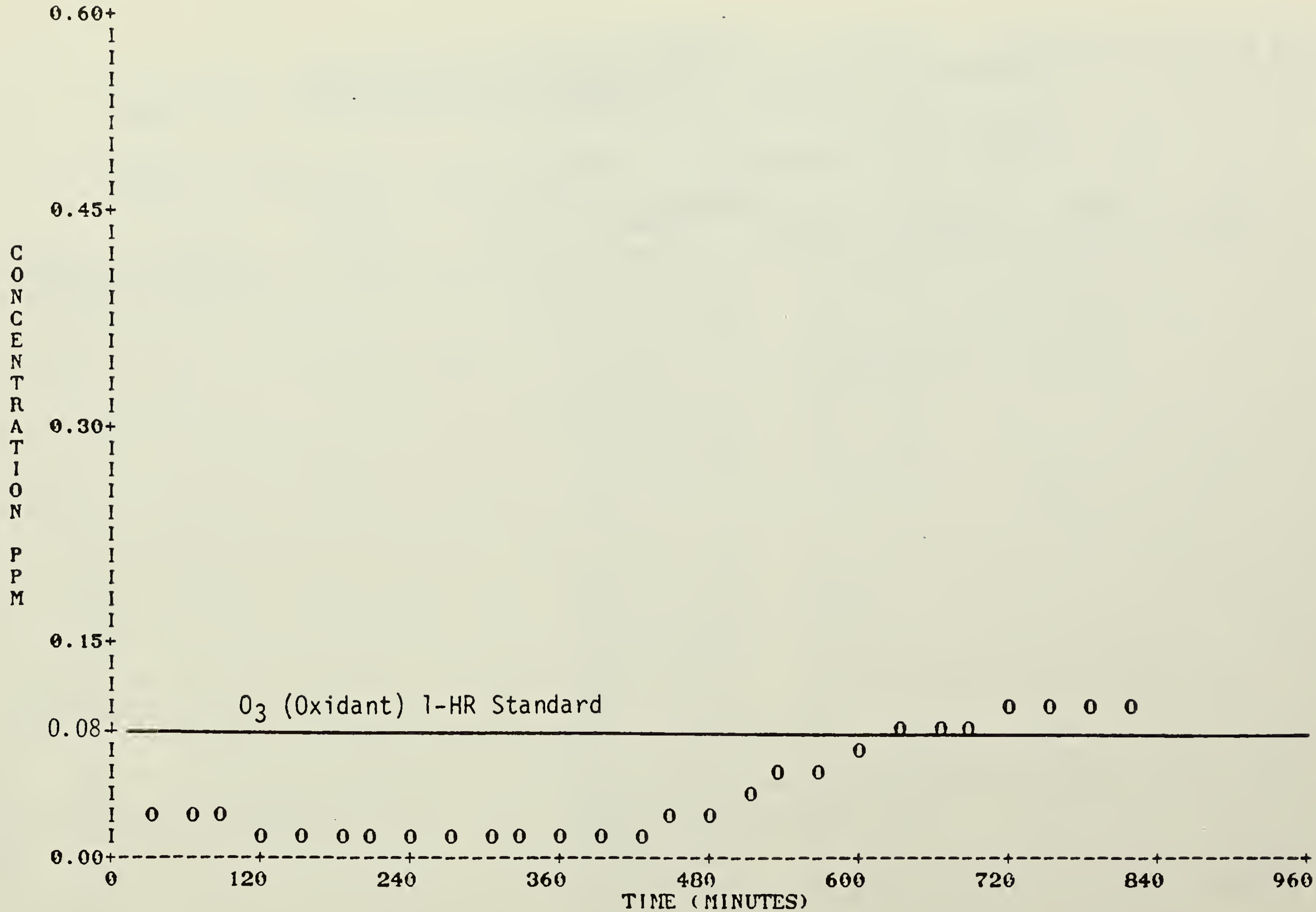


FIGURE . YB -- SF-LIV. SPECIES O3 CONCENTRATION SCALE FACTOR 1

FIGURE 2. O_3 CONCENTRATIONS PREDICTED BY THE TRAJECTORY MODEL FOR THE TRAJECTORY FROM YBC TO LIVERMORE

FIGURE . YB -- SF-SJ. SPECIES NO2 CONCENTRATION SCALE FACTOR 1

FIGURE 3. NO_2 CONCENTRATIONS PREDICTED BY THE TRAJECTORY MODEL FOR THE TRAJECTORY FROM YBC TO SAN JOSE

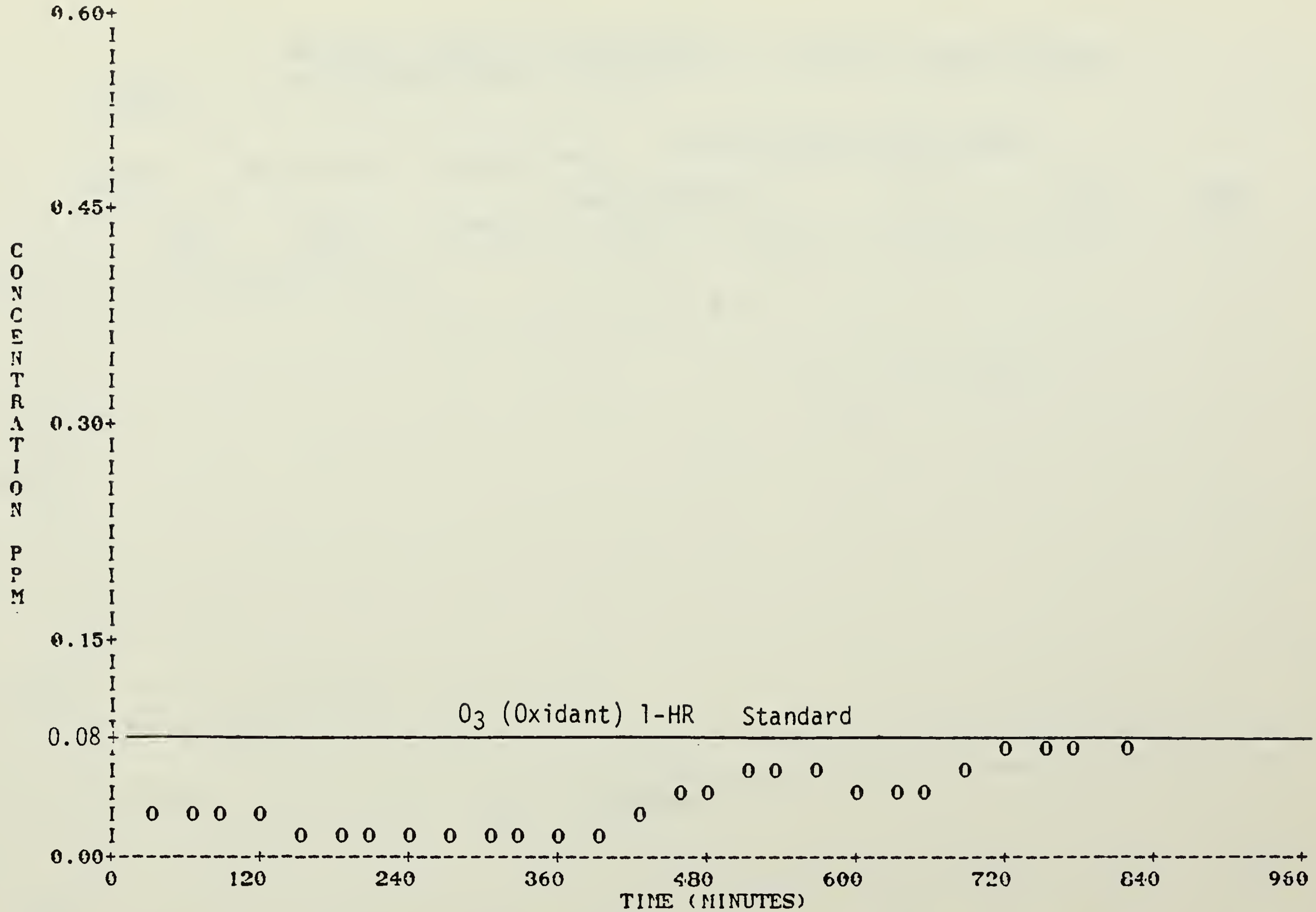


FIGURE . YB -- SF-SJ. SPECIES O3 CONCENTRATION SCALE FACTOR 1

FIGURE 4. O_3 CONCENTRATIONS PREDICTED BY THE TRAJECTORY MODEL FOR THE TRAJECTORY FROM YBC TO SAN JOSE

TABLE 3. TRAJECTORY MODEL PREDICTIONS OF OZONE AND NITROGEN DIOXIDE CONCENTRATIONS

	Concentration (ppm)			
	Livermore (San Francisco to Livermore Trajectory)		San Jose (San Francisco to San Jose Trajectory)	
Simulated Emissions	Ozone	Nitrogen Dioxide	Ozone	Nitrogen Dioxide
1988 Base year	0.124	0.063	0.094	0.078
Emissions at YBC grid reduced by difference between YBC emissions in 1988 and "Base Year" 1988 emissions	0.123	0.062	0.094	0.078
Emissions at YBC grid reduced by twice the above difference (for further sensitivity check, including check of effect of errors in emissions)	0.123	0.063*	0.093	0.077

*The rise here is a result of the complicated chemistry of oxidant formation. Sometimes an increase in source emissions of one or the other primary ingredient (hydrocarbons or nitrogen oxides) can lead to a reductionin oxidant (ozone) or NO_2 level at a particular downwind point. These concentrations are based on the "Supplement 5" data. Changing the input emission values to "Supplement 8" and revised ARB NO_X values would change the table entries, but would have no effect on the conclusion about statistical insignificance of differences among these cases (SAI judgment).

FOOTNOTES

1/ Systems Applications, Inc., Analysis of the Impact on Ambient Oxidant and Carbon Monoxide of Emissions from the Proposed Yerba Buena Center, September, 1977.

2/ Anderson, G. E., et al., 1977, Air Quality in the Denver Metropolitan Region, 1974-2000, EPA-908/1-77-002, Environmental Protection Agency Region VIII, Denver, Colorado.

3/ Environmental Protection Agency (EPA), 1975, Supplement No. 5 for Compilation of Air Pollutant Emission Factors, Research Triangle Park, North Carolina.

4/ Lawrence Livermore Laboratory (LLL), 1974, Development of an Air Pollution Model for the San Francisco Bay Area, 2nd Semiannual Report to the National Science Foundation by LLL, University of California, Livermore, California.

APPENDIX G. AMBIENT NOISE MEASUREMENT SURVEY

Introduction

From 8 June to 8 August 1977, measurements were made throughout the Redevelopment Area by an acoustical consultant firm (Charles Salter) under contract to the City and County of San Francisco to provide data on the existing noise environment. Field measurement locations were selected to provide a representative sampling of the area with particular emphasis on existing and prospective housing sites. The 25 measurement locations are shown in Figure VII.H-1. These site locations are listed in Table 1.

Throughout the measurement period, the weather was typical for San Francisco during the summer months. The wind varied from calm to 15 mph; the temperature was between 50° and 70°F, and the sky conditions ranged from clear to overcast with fog. No rain occurred during the measurements nor were any temperature inversions noted. The acoustical effect of these mild weather conditions on the measurement is considered to be negigible due to the relatively short propagation distances between the noise sources and the microphone.

Data Analysis

The data were analyzed in terms of L_{10}, L_{50}, L_{90}, and L_{eq} for several reasons. The L_{10} descriptor (measure) is used by the City and County of San Francisco to evaluate impact caused by increases in traffic noise. The L_{50}, or average sound level, is used by San Francisco to assess the construction noise impact. The L_{90}, or background noise level, is used by the City and County of San Francisco for determining acoustical impact due to steady-state noise sources such as mechanical equipment on and in buildings. The L_{eq} (energy-averaged level) is the basic unit of measurement for determining the CNEL.

The tape-recorded data were analyzed with a real-time analyzer coupled to a programmable calactor. The calculator automatically computed the noise level descriptors listed in the tables. The acoustical calibration signal on the tape recording was used to adjust the real-time analyzer to indicate the correct noise level. In addition, the B&K 166/S.45 Environmental Noise Classifier was used to analyze tape-recorded samples. In a backup technique, the noise descriptors (such as L_{10}, L_{50}, etc.) were calculated manually from the statistical data. These two systems are both suitable for achieving the necessary precision in analyzing environmental noise data (+0.5 dB(A)), but the real-rime analyzer has the advantage of minimizing human error.

TABLE 1. AMBIENT NOISE MEASUREMENT LOCATIONS* IN THE REDEVELOPMENT AREA

Site	Description
A	Hawthorne between Folsom and Howard 25' from center line of street
B	Harrison between Hawthorne and Third (in parking lot across from 665 Harrison) about 50' from near lane
C	East corner of Harrison and Third (in parking lot) 50' from near lane of each street
D	Harrison Street (in Metro parking lot directly across from 735 Harrison) about 50' from near lane
E	Fourth Street (in U-Park & Lock) directly across from 345 Fourth, about 50' from Fourth and Shipley near lanes
F	South side of Folsom Street (U-Park & Lock) between Third and Fourth about 50' from Folsom near lane
G	Third Street between Howard and Folsom about 50' from Third Street near lane
H	North side of Fourth Street between Folsom and Howard 50' from Fourth near lane, directly across from 250 Fourth
I	East corner of Howard and Third, about 100' from near lane of each street
J	East corner of Mission and Third (in Metro parking lot) about 150' from intersection and about 50' from Mission Street near lane
K	North corner of Fourth and Mission (at demolition site; microphone was mounted on mound above street level) about 80' from Mission Street near lane, 100' from Fourth Street near lane
L	North side of Fourth Street about 120' northwest of intersection with Howard, about 50' from Fourth Street near lane
M	Off Clementina on Gallagher about 50' from center of Gallagher, on housing projects' lawn

*See Figure VII.H-1.

TABLE 1. (Continued)

Site	Description
N	South corner of Third and Folsom (U-Park & Lock), 100' from near lane of each street
O	South side of Third Street between Mission and Howard, about 50' from near lane of Third
P	In middle of block bounded by Howard, Folsom, Third and Fourth Streets (Metro parking lot)
Q	In middle of block bounded by Mission, Howard, Third and Fourth Streets (parking lot)
R	South side of Market Street Between Third and Fourth, 100' from near lane of Market
S	On Second between Folsom and Howard, 8' from near lane of Second
T	South side of Mission between Third and New Montgomery at curbside
U	On Clementina west of Fourth (near Clementina Towers) at curbside
V	North side of Mission Street, between Fourth Street and St. Patrick's Church, at curbside
W	On Harrison Street between Hawthorne and Third, opposite Golden Gate Recording Studios, at curbside
X	On south side of Howard 75' west of Fourth (at TODCO Housing site), second floor outside
Y	South side of Howard between Third and Hawthorne

Noise Measurements

Measurements were taken two or more times at most sites during various times of the day or night to improve statistical validity of the data. Construction activity precluded measurements at a few sites during some time periods. The data were measured in 15-minute samples for spot-checking levels at various locations and to accumulate the maximum number of valid samples within the available time schedule. Tables 2, 3, and 4 show the 15-minute measurements between 8:00 a.m. and 12:00 noon, between 12:00 noon and 6:00 p.m., and between 6:00 p.m. and 10:00 p.m. respectively.

Twenty-four-hour and 48-hour measurements were taken to comply with HUD and California noise assessment standards. The measured data at Sites U, V, W, X, Y and Z are displayed in Tables 5 through 10B, respectively. Some of the data were analyzed in three-hour increments since hour-to-hour data variations were found to be insignficant in statistical terms. The data recorded from 7:00 p.m. to 10:00 p.m. were segregated to facilitate the CNEL computation (results shown in the tables).

The 15-minute samples were obtained with a Bruel & Kjaer (B&K) Model 166/S.45 Environmental Noise Classifier. A B&K 2219 Sound Level Meter was used to verify that the B&K 166/S.45 was operating properly. The amplified A-weighted signal from this sound level meter was fed into the B&K 166/S.45 (rather than a direct microphone input into the B&K 166/S.45); this took advantage of the wide dynamic range and accurate weighting network available from the sound level meter.

Twenty-four-hour measurements were taken with a microsampling system consisting of the following instruments:

Bruel & Kjaer (B&K) 4230 Calibrator
B&K 2219 Sound Level Meter with AC output
Uher CR134 Tape Recorder
Microsampling Timer
Control cables and external battery

This equipment was mounted in a metal box approximately 12' above the ground on utility and Muni Railway poles.

An acoustical calibration signal accurate to within 1/4 dB calibrated the sound level meter and the tape recorder. The microsample timer operating the recorder was set so that the microphone signal would be recorded one second every 35 seconds. The finished tape recording consisted of a series of calibrated environmental noise "micro" samples. This microsampling process has proven to be accurate both experimentally and in community noise applications (Kamperman 1972).

During the recording process, the amplified microphone signal was periodically monitored by the operator with a headset. This precaution insured that extraneous signals (electrical noise, hum, static, etc) were not interfering with the recording of environmental acoustical data.

TABLE 2. MEASURED NOISE LEVELS IN THE REDEVELOPMENT AREA (15-MINUTE MEASUREMENTS BETWEEN 8:00 AM & 12:00 NOON)

Site	Date	Time*	L_{10}	L_{50}	L_{90}	L_{eq}
A	7/13/77	11:10 AM	74	69	62.5	70
	7/19/77	8:34 AM	71	64.5	61	66
B	7/13/77	11:40 AM	65	60.5	58	62
	7/18/77	10:32 AM	65	61	59	63
C	7/18/77	10:51 AM	72	68.5	65.5	69
	7/19/77	9:20 AM	72	68.5	66	68
D	7/20/77	9:26 AM	64	61	60	61
E	7/20/77	9:53 AM	68	60	57	64
F	7/18/77	11:34 AM	64	59.5	57	63
G	7/18/77	10:13 AM	67	63	60	63
	7/20/77	10:20 AM	66	60	56	62
H	7/18/77	9:48 AM	66	61	57	63
I	7/19/77	10:56 AM	64	59.5	59	60
	8/3/77	8:56 AM	64	59	58	61
J	7/14/77	8:19 AM	71	67	63	68
	7/19/77	11:12 AM	65	61	58	62
K	7/14/77	8:53 AM	66	61	59	63
	7/19/77	11:37 AM	67.5	61	59	65
L	7/14/77	9:39 AM	66	60	55	62
M	7/14/77	10:20 AM	66.5	61	56.5	62
N	7/14/77	10:52 AM	62.5	59	56	59
P	7/20/77	10:48 AM	58	55	54	56
	8/3/77	9:37 AM	59	56	52.5	57
Q	7/20/77	11:17 AM	58	55	54	55

*Start of measurement.

NOTE: Sound levels in dB(A). No measurement at site "O" because of construction activities.

TABLE 3. MEASURED NOISE LEVELS IN THE REDEVELOPMENT AREA (15-MINUTE MEASUREMENTS BETWEEN 12:00 NOON & 6:00 PM)

Site	Date	Time	L_{10}	L_{50}	L_{90}	L_{eq}
B	7/21/77	1:20 PM	64	62	59	62
	8/2/77	5:24 PM	64	59	56.5	63
C	7/21/77	1:56 PM	72	69	67	67
D	7/13/77	1:00 PM	66.5	62	59.5	63
E	7/13/77	1:40 PM	69	62.5	58	66
	8/2/77	4:54 PM	68	64	58	66
F	7/13/77	2:24 PM	64	59	56.6	62
G	7/13/77	2:56 PM	64	60	57.5	60
H	7/13/77	4:40 PM	67.5	64	61	64
I	7/13/77	5:25 PM	59	65	62.5	66
	7/18/77	11:10 PM	63	60.5	59	60
J	7/18/77	1:07 PM	70.5	66	63	67
K	7/18/77	1:37 PM	66	61	57	63
	8/2/77	4:21 PM	65	59	55.5	61
L	7/18/77	2:02 PM	64	61	58.5	61
M	7/18/77	2:27 PM	67.5	61	56	65
N	8/3/77	3:26 PM	63	59	57	61
O	7/18/77	2:57 PM	63	60	58	60
P	8/2/77	1:55 PM	59.5	56.5	55	58
Q	8/2/77	2:31 PM	60.5	57	55.5	59
S	8/2/77	3:44 PM	63.5	59.5	56.5	61
T	8/2/77	3:02 PM	72.5	65	60.5	69

NOTE: Sound levels in dB(A). No measurements at Sites "A" and "B" because of construction activities.

TABLE 4. MEASURED NOISE LEVELS IN THE REDEVELOPMENT AREA (15-MINUTE MEASUREMENTS BETWEEN 6:00 PM & 10:00 PM)

Site	Date	Time	L_{10}	L_{50}	L_{90}	L_{eq}
A	7/14/77	8:40 PM	64	59	56	62
B	7/19/77	6:44 PM	56	61	60	62
C	7/19/77	7:06 PM	72.5	69	66	69
D	7/14/77	6:37 PM	66	61.5	60	63
E	7/14/77	7:02 PM	71.5	62	57.5	64
F	7/19/77	7:29 PM	63	59	56.5	59
G	7/14/77	8:13 PM	66	60	58	62
H	7/14/77	7:52 PM	65.5	60.5	57.5	61
I	7/19/77	7:49 PM	67.5	61	58	63
J	7/19/77	8:14 PM	66	61	57	62
K	7/19/77	8:34 PM	61	56	53.5	57
L	7/19/77	8:58 PM	63.5	58	55	59
M	7/14/77	7:28 PM	59.5	55	54	56
N	8/2/77	8:33 PM	61	57	54	59
O	8/2/77	9:07 PM	62	57	55.5	59
P	8/2/77	6:59 PM	59	56	55	58
Q	8/2/77	7:24 PM	58	54	53	56
R	8/2/77	7:53 PM	62	57	56	60
S	8/2/77	8:14 PM	79	69	64	75

NOTE: Sound levels in dB(A).

TABLE 5. MEASURED NOISE LEVELS AT SITE U ON MISSION BETWEEN THIRD & NEW MONTGOMERY STREETS 3-4 AUGUST 1977

Period	L_{10}	L_{33}	L_{50}	L_{90}	L_{eq}
12:30 - 1:00 PM Wed.	75	72	70	65.5	72
1:00 - 4:00	75	72	70.5	67.5	71.5
4:00 - 7:00	76	73	72	67	74
7:00 - 10:00	73	69	67	60	69
10:00 - 1:00 AM Thur.	72	68	66	61	69
1:00 - 4:00	70	66	63	57	67
4:00 - 7:00	68	62	59	54	65
7:00 - 10:00	75.5	71	70	63.5	71.5
10:00 - 12:30 PM	76	72.5	71	67	72

L_{33}(24-hour) = 69

CNEL = 75

NOTE: Sound levels in dB(A)

TABLE 6. MEASURED NOISE LEVELS AT SITE W ON MISSION BETWEEN FOURTH STREET & ST. PATRICK'S CHURCH 2-3 AUGUST 1977

Period	L_{10}	L_{33}	L_{50}	L_{90}	L_{eq}
1:00 - 4:00 PM Tues.	74	70	68	64	70
4:00 - 7:00	77	72	70	65	71
7:00 - 10:00	71	66	63	59	66
10:00 - 1:00 AM Wed.	69	63	62	56	64
1:00 - 4:00	64	58	56	50	59
4:00 - 7:00	65	59	55	49	60
7:00 - 10:00	73	69	67	62	69
10:00 - 1:00 PM	74	70	68	63	69

L_{33}(24-Hour) = 68

CNEL = 71

TABLE 7. MEASURED NOISE LEVELS AT SITE V ON CLEMENTINA BETWEEN FOURTH & GALLAGHER STREETS 4-5 AUGUST 1977

Period	L_{10}	L_{33}	L_{50}	L_{90}	L_{eq}
1:00 - 4:00 PM Thur.	74	67	65	60	68
4:00 - 7:00	69	64	62	59	65
7:00 - 10:00	65	61	59	56	60
10:00 - 1:00 AM Fri.	61	58	56	54	58
1:00 - 4:00	62	55	53	50	58
4:00 - 7:00	63	56	54	50	58
7:00 - 10:00	70	53	61	57	67
10:00 - 1:00 PM	72	64	62	59	66

L_{33}(24-hour) = 62

CNEL = 67

NOTE: Sound levels in dB(A)

TABLE 8. MEASURED NOISE LEVELS AT SITE X ON HARRISON BETWEEN HAWTHORNE & THIRD STREETS 26-27 JULY 1977

Period	L_{10}	L_{33}	L_{50}	L_{90}	L_{eq}
5:30 - 7:00 PM Tues.	71	68	67	64	68
7:00 - 10:00	69	65	64	62	67
10:00 - 11:00	66	64	63	62	65
11:00 - 2:00 AM Wed.	67	64	63	57	66
2:00 - 5:00	62	59	57	54	61
5:00 - 7:00	68	64	62	57	64
7:00 - 10:00	75	72	70	66	72
10:00 - 1:00 PM	75	71	69	67	71
1:00 - 2:30	72	70	69	67	70
2:30 - 4:30	73	70	69	66	71
4:30 - 6:30	74	71	70	68	72

L_{33}(24-hour) = 68

CNEL = 72

27-28 JULY 1977

Period	L_{10}	L_{33}	L_{50}	L_{90}	L_{eq}
7:00 - 10:00 PM Wed.	67	67	63	60	64
10:00 - 1:00 AM Thur.	66	62	61	57	63
1:00 - 4:00	63	57	55	52	58
4:00 - 7:00	65	62	59	52	60
7:00 - 10:00	72	68	67	64	68
10:00 - 1:00 PM	72	68	67	64	68
1:00 - 4:00	72	70	68	64	69
4:00 - 7:00	72	69	68	63	68

L_{33}(24-hour) = 67

CNEL = 69

NOTE: Sound levels in dB(A)

TABLE 9A. MEASURED NOISE LEVELS AT SITE Y
811-815 HOWARD STREET (NEAR FOURTH)
21-22 JULY 1977

Hour	L_{10}	L_{33}	L_{50}	L_{90}	L_{eq}
3:00 - 4:00 PM Thur.	76	73	72	68	73
4:00 - 5:00	77	74	73	70	74
5:00 - 6:00	76	74	73	69	73
6:00 - 7:00	73	71	69	65	70
7:00 - 8:00	71	67	66	62	68
8:00 - 9:00	71	67	65	62	70
9:00 - 10:00	70	66	64	61	67
10:00 - 11:00	70	67	64	60	67
11:00 - 12:00	69	65	63	59	67
12:00 - 1:00 AM Fri.	70	65	63	58	67
1:00 - 2:00	66	62	59	56	64
2:00 - 3:00	67	61	58	55	65
3:00 - 4:00	63	58	56	55	60
4:00 - 5:00	60	57	56	54	57
5:00 - 6:00	65	59	58	54	62
6:00 - 7:00	69	64	62	58	66
7:00 - 8:00	76	70	68	65	72
8:00 - 9:00	74	72	70	66	71
9:00 - 10:00	75	70	68	64	72
10:00 - 11:00	75	72	70	66	73
11:00 - 12:00	76	72	70	66	73
12:00 - 1:00 PM	74	71	70	66	71
1:00 - 2:00	77	73	72	67	73
2:00 - 3:00	74	72	71	67	72

L_{33}(24-hour) = 70

CNEL = 74

NOTE: Sound levels in dB(A)

TABLE 9B. MEASURED NOISE LEVELS AT SITE Y 811-815 HOWARD STREET (NEAR FOURTH)
8-9 JUNE 1977

Hour	L_{10}	L_{33}	L_{50}	L_{90}	L_{eq}
3:00 - 4:00 PM Wed.	77	74	73	70	75
4:00 - 5:00	78	76	75	72	76
5:00 - 6:00	78	76	74	72	76
6:00 - 7:00	77	74	72	68	75
7:00 - 8:00	74	70	70	67	77
8:00 - 9:00	72	70	68	66	70
9:00 - 10:00	71	68	66	64	68
10:00 - 11:00	72	68	67	64	69
11:00 - 12:00	70	67	66	64	67
12:00 - 1:00 AM Thur.	72	65	64	61	68
1:00 - 2:00	70	6	66	63	67
2:00 - 3:00	66	62	62	59	64
3:00 - 4:00	63	58	57	54	61
4:00 - 5:00	64	58	56	54	65
5:00 - 6:00	64	58	57	54	62
6:00 - 7:00	72	64	62	59	68
7:00 - 8:00	76	70	66	61	72
8:00 - 9:00	76	72	70	64	74
9:00 - 10:00	77	73	70	64	74
10:00 - 11:00	78	74	72	66	76
11:00 - 12:00	76	72	70	66	74
12:00 - 1:00 PM	78	74	72	66	74
1:00 - 2:00	76	73	72	65	73
2:00 - 3:00	80	72	70	66	76

L_{33}(24-hour) = 71

CNEL = 75

NOTE: Sound levels in dB(A)

TABLE 10A. MEASURED NOISE LEVELS AT SITE Z
ON HOWARD BETWEEN THIRD & HAWTHORNE STREETS
5-6 AUGUST 1977

Period	L_{10}	L_{33}	L_{50}	L_{90}	L_{eq}
2:00 - 4:00 PM Fri.	75	72	71	66	71
4:00 - 7:00	77	73	72	68	74
7:00 - 10:00	71	67	66	62	67
10:00 - 1:00 AM Sat.	70	66	62	60	66
1:00 - 4:00	68	63	61	56	64
4:00 - 7:00	67	61	58	54	62
7:00 - 10:00	71	67	65	61	67
10:00 - 1:00 PM	72	68	67	63	67
1:00 - 4:00	70	68	67	62	68
4:00 - 7:00	73	69	67	64	69
7:00 - 10:00	71	66	64	60	67
10:00 - 1:00 AM	70	65	64	60	66

Saturday L_{33}(24-hour) = 66

Saturday CNEL = 72

NOTE: Sound levels in dB(A)

TABLE 10B. MEASURED NOISE LEVELS AT SITE Z ON HOWARD BETWEEN THIRD & HAWTHORNE STREETS 7-8 AUGUST 1977

Period	L_{10}	L_{33}	L_{50}	L_{90}	L_{eq}
1:00 - 4:00 AM Sun.	68	62	61	56	65
4:00 - 7:00	64	58	56	53	60
7:00 - 10:00	70	65	62	57	65
10:00 - 1:00 PM	72	68	66	61	68
1:00 - 4:00	73	66	65	60	66
4:00 - 7:00	71	68	66	62	67
7:00 - 10:00	69	65	63	60	65
10:00 - 1:00 AM Mon.	68	64	62	58	64
1:00 - 4:00	65	59	57	54	60
4:00 - 7:00	66	62	60	54	64
7:00 - 10:00	77	73	71	66	72
10:00 - 1:00 PM	76	71	69	65	71
1:00 - 2:50	75	72	70	66	71

Sunday L_{33}(24-Hour) = 64

Sunday CNEL = 71

NOTE: Sound levels in dB(A)

APPENDIX H. NOISE CRITERIA

This appendix summarizes the noise criteria applicable to the Yerba Buena Center Redevelopment Area.

Construction Noise Criteria

The criteria that apply to construction activities in San Francisco are in Ordinance 274-72, "Regulation of Noise", Section 2907 adopted 10 August 1973. The ordinance requires that all powered construction equipment, except impact tools and equipment, not emit more than 80 dB(A), measured at 100 feet. Impact tools and equipment including pavement breakers and jackhammers must have both intake and exhaust muffled to the satisfaction of the Director of Public Works. The ordinance requires a special permit for construction after 8:00 p.m. and before 7:00 a.m.

Post-Construction Noise Criteria for Housing

The impact criteria for post-construction noise in the Redevelopment Area depend on the land use. The applicable criteria are:

California Standards. All multi-family housing in the area must meet the requirements of the California Noise Insulation Standards, Title 25, Chapter 1, Subchapter 1, Article 4, of the California Administrative Code. The standard requires that noise levels in any habitable room not exceed 45 CNEL. In order to insure that the interior standard is met, the law further requires that multi-family dwellings to be located within an annual exterior CNEL contour of 60 dB adjacent to traffic arteries shall require an acoustical analysis showing that the proposed building has been designed to limit intruding noise to the allowable interior noise level.

HUD Standards. Housing for which the Department of Housing and Urban Development provides subsidies or mortgage insurance is under the control of Departmental Circular 1390.2, "Noise Abatement and Control". HUD discourages the construction of new dwelling units on sites which have or are projected to have unacceptable noise exposure. The HUD external noise criteria are:

An "unacceptable" noise exposure exists whenever the noise in exterior areas of the site 4/

- exceeds 80 dB(A) 60 minutes per 24 hours
- exceeds 75 dB(A) 8 hours per 24 hours

(Exceptions are strongly discouraged and require a 102(2)C environmental statement 4/ and the Secretary's approval)

A "discretionary - normally unacceptable" exterior noise exposure exists whenever the noise in exterior areas of the site 4/

- exceeds 65 dB(A) 8 hours per 24 hours

- include loud repetitive sounds on site.

A "discretionary - normally acceptable" exterior noise exposure exists whenever the noise in exterior areas of the site 4/

- does not exceed 65 dB(A) more than 8 hours per 24 hours

An "acceptable" exterior noise exposure exists whenever noise in exterior areas of the site 4/

- does not exceed 45 dB(A) more than 30 minutes per 24 hours.

In addition to the exterior noise standard, HUD also has a standard for interior noise exposure. Noise levels in sleeping quarters are considered "acceptable" if interior noise levels resulting from exterior noise sources and from building equipment such as heating, plubming, and air conditioning:

- do not exceed 55 dB(A) more than an accumulation of 60 minutes in any 24-hour period, and

- do not exceed 45 dB(A) more than 30 minutes during nighttime sleeping hours from 11 p.m. to 7 a.m., and

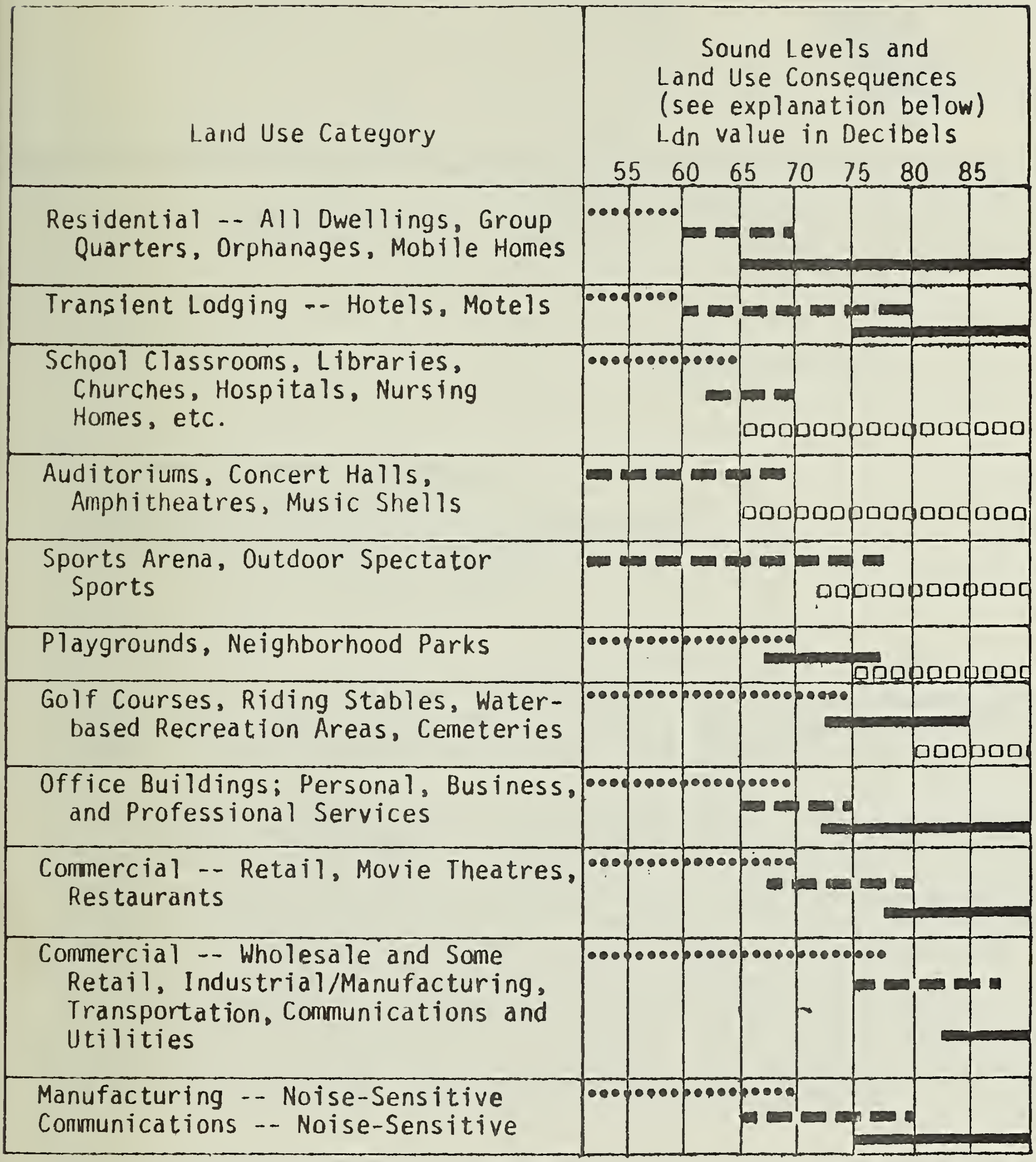
- do not exceed 45 dB(A) more than an accumulation of eight hours in any 24-hour day.

Post-Construction Noise Criteria for Non-Housing Areas

Criteria for office, commercial, light industrial and other types of development (in addition to residential) are stated in the Transportation Noise Element of San Francisco's General Plan. These goals are shown in Figure 1 attached.

FIGURE 1.

LAND USE COMPATIBILITY CHART FOR COMMUNITY NOISE*



Explanation of Land Use Consequences

•••••• Satisfactory, with no special noise insulation requirements.

▬ ▬ New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

▬▬▬ New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

□□□□ New construction or development should generally not be undertaken.

*Transportation Noise Element of the Comprehensive Plan of San Francisco, San Francisco Department of City Planning, August 1974.

APPENDIX I

NOV 23 1977

SAN FRANCISCO REDEVELOPMENT AGENCY

939 ELLIS STREET • SAN FRANCISCO 94109
ADDRESS MAIL TO POST OFFICE BOX 646 • SAN FRANCISCO, CALIFORNIA 94101

(415) 771-8800

REFER TO
110-8277-128

November 22, 1977

Mr. James H. Price, Director
San Francisco Area Office
Department of Housing and Urban Development
One Embarcadero Center, Suite 1600
San Francisco, California 94111

Dear Mr. Price:

The purpose of this letter is to respond to your correspondence of November 4, 1977, in an attempt to clarify the land use and design changes which the Agency might be considering within the Yerba Buena Center Redevelopment Project Area.

Even though the Agency has not made any decisions about a new development policy or a proposed redevelopment plan amendment, there are certain facts and assumptions which can be stated or postulated at this point for the purpose of beginning the preparation of an Environmental Impact Statement for the subject project. After the California Environmental Quality Act Environmental Impact Report has been certified, and the Agency Commission has had proper time to adequately consider its findings, the Agency Commission will be in a position to propose an Official Redevelopment Plan Amendment and determine the changes in the project from the project considered in the previous Environmental Impact Statement if it so desires. We anticipate that the Agency Commission will be in a position to do so sometime during the period from March 7 to April 15, 1978.

The attached project map indicates both the current status of the project and those alternate permitted uses which the Agency is considering for the Environmental Impact Statement. The graphic patterns indicated on the map depict those land uses now allowed by the Approved Redevelopment Plan. The colors on the map indicate: (1) the existing status of each land parcel and (2) possible future plan changes to allow alternate land uses in addition to those now permitted (which are shown in the graphic patterns).

Those land parcels indicated on the map with a heavy line around them and shaded are land uses which will remain in their current status or will be rehabilitated with no change in use.

The parcels which are purple in color indicate land where a HUD approved land disposition agreement for the sale of land is currently in existence.

The red-colored parcels indicates land upon which the Agency is pursuing a development potential with a development entity.

The land parcel indicated in the yellow color denotes a possible future alternate permitted use of public parking.

The parcels indicated in the green color depict land where housing may be permitted in the future as an alternate permitted use.

The land parcel indicated on the map in black depicts an alternate permitted site for the hotel which is now permitted on either Central Blocks #2 or #3.

Additionally, for the purposes of the Environmental Impact Statement, the following development assumptions can be postulated:

a) The sports arena is no longer in the development program;

b) a convention center may be developed on Central Block #3. The convention center will be partially underground, if financially feasible, and will contain no on-site parking;

c) a recreation/entertainment complex may be developed on the surface of the convention center and on the western 2/3rds of Central Block #2. If the committed use (the Apparel Mart) does not materialize, the recreation/entertainment complex may occupy all of Central Block #2 and may contain the same number of on-site parking spaces as are now programmed for the Apparel Mart. The complex will be composed of 2 and 3 story buildings, with approximately 50 percent land coverage and contain no on-site parking other than that mentioned above. The complex may contain a mixture of recreation, commercial, entertainment, and cultural uses;

d) automobile parking for the convention center and recreation/entertainment complex may be accommodated in one of the following ways:

   1. Provided by adjacent private development, or

   2. provided partially by adjacent private developers and partially by the City's parking authority, or

   3. provided, at an adjacent location, by the City's parking authority.

   The exact number of parking spaces to be programmed is not known at this time. However, this subject is presently under study as a part of an Environmental Impact Report being prepared by Environmental Science Associates, Inc., and the Urban Design Study being conducted by Skidmore, Owings & Merrill. As soon as a firmer definition of the number of parking spaces to be programmed is available, we will supply that information to your office.

e) There are four structures which have or may have historical/ architectural significance. The St. Patrick's Church and the old Police Substation (now owned by the Salvation Army) will remain in their current use and condition. The Jessie Street Substation and the Mercantile Building may be retained and rehabilitated (for reuse as office/retail space) if financially feasible.

f) The five land parcels indicated as possible alternate permitted housing sites may contain up to a total of 900 dwelling units. Each site may contain the following number of dwelling units:

1. Site A - up to 400 dwelling units,
2. Site B - up to 100 dwelling units,
3. Site C - up to 100 dwelling units,
4. Site D - up to 120 dwelling units, and
5. Site E - up to 180 dwelling units.

At the present time, no further elderly housing is contemplated. The housing units will be primarily for families and single individuals, primarily rental units with some sales units, and with the majority of the units being available at market rate with the possibility of some limited amount of subsidized units.

g) The amount of office and retail square footage presently programmed may be found in the Administrative Draft of Yerba Buena Center Environmental Impact Report (Volume 1, Description of Alternatives, Section IV, Page 6).

We hope that this information is sufficient to begin your Environmental Impact Statement. If you need further clarification, please feel free to contact me personally or Mr. Thomas G. Conrad, Chief of Planning, Housing and Programming.

Sincerely,

Wilbur W. Hamilton
Executive Director

Enclosures: 6

cc: Mr. Roger Boas
Chief Administrative Officer

NOTE: ORIGINAL MAP SUBMITTED WAS IN COLOR AND IS NON-REPRODUCABLE FOR THIS EIS. ALL DATA FROM MAP IS CONTAINED ON MAPS IN PART IV, PROJECT DESCRIPTION.

RESOURCE USE

CALCULATIONS FOR CONSUMPTION OF WATER BY LAND USES IN YBC: 1988

		Determined Uses		Determined Uses Plus Maximum Permitted Housing and Rec./Entertainment Park	
Land Use Category	Estimating Factor /1/	Unit (Sq. ft.)/2/	Gallons/ Day	Unit (sq. ft.)/2/	Gallons/ Day
Office	125 gal/1000/day	6,214,450	776,750	6,214,450	776,750
Retail Commercial	200 gal/1000/day	676,550	135,400	676,550	135,400
Pedestrian Concourse	30 gal/100/day /3/	163,220	4,890	163,220	4,890
Hotel Rooms	200 gal/room/day /4/	700 Rooms	140,000	700 Rooms	140,000
Convention Facility:					
Visitors	5 gal/vis/day /5/	2700 vis/day/6/	13,500	2700 vis/day/6/	13,500
Employees	20 gal/emp/day	800 emp/day	16,000	800 emp/day	16,000
Light Industrial	100 gal/1000/day	1,077,450	107,700	1,077,450	107,700
Public Park	60 gal/1000/day /3/	450,000	27,000	-	-
Commercial, Entertainment	100 gal/1000/day	400,000	40,000	400,000	40,000
Rec/Entertainment Park:					
Visitors	5 gal/vis/day	---	---	17800 vis/day/2/	89,000
Grounds	60 gal/1000/day /3/	---	---	756,800	45,000
Housing	200 gal/DU/day /4/	50 DU	10,000	950 DU	190,000
Total Consumption			1,271,240		1,558,660
			1.27 mgd8 (464 mg/yr.)		1.56 mgd8 (569 mg/yr.)

See following page for listing of footnotes

FOOTNOTES

1. Unless otherwise noted, taken from: Brown and Caldwell, Consulting Engineers, Report on Wastewater Loading from Selected Redevelopment Areas, February, 1972.

2. Square feet unless otherwise noted.

3. Park irrigation calculated at three acre-feet of water per acre each year; concourse irrigation calculated at one-half this amount.

4. Metcalf and Eddy, Wastewater Engineering: Collection, Treatment, Disposal, McGraw-Hill, 1972.

5. Estimating factor of five gallons per visitor per day provided by convention center architects.

6. High annual attendance figure of 985,000 visitors based on total annual 1976 attendance of 973,000 at similar Los Angeles Convention Center and estimated convention-use-only attendance figure of 475,000 in 1988 provided by R. Sullivan, General Manager, San Francisco Visitors and Convention Bureau, telephone communication, August 22, 1977.

7. Based on high annual recreation/entertainment park attendance of 6,500,000 people estimated by R. Gryziec, letter dated July 26, 1977.

8. Million gallons per day.

APPENDIX K: AVAILABLE SOCIAL SERVICES SOUTH-OF-MARKET DISTRICT, July 1977

Organization	Type of Service	Area of Coverage	Location
Clementina Towers	Recreation, Counseling	S-O-M	320 Clementina St.
Alexis Apartments	Recreation, Counseling	S-O-M	390 Clementina St.
Silvercrest Residence	Recreation, Health, Hot Lunch Programs	S-O-M	133 Shipley St.
Medi-Cal	AFDC	S.F.	965 Mission St.
South of Market Health Center	General Medical Services	S-O-M	551 Minna St.
S.F. Department of Public Health	VD Clinic	S.F.	250 Fourth St.
Golden Gate Regional Center for Developmentally Disabled	Developmentally Disabled	West Bay	346 - 9th St.
San Francisco Coalition	Affirmative Action	S.F.	693 Mission St.
S.F. District Attorney	AFDC Family Support Bureau	S.F.	814 Mission St.
Fort Help	Crisis Intervention	S.F.	169 - 11th St.
S.F. Gospel Rescue Mission	Religious, Food, Shelter	S-O-M	221 - 6th St.
Lifeline Mission	Religious, Food Shelter	S-O-M	917 Folsom St.

Organization	Type of Service	Area of Coverage	Location
Oliver House	Alcoholic Recovery House	S-O-M	80 - 9th St.
Goodwill Industries	Disabled Employment Training	S.F.	980 Howard St.
Stepping Stone	Religious, Food, Shelter	S.F.	255 - 10th St.
Utility Workshop	Employment & Training	S.F.	1118 Howard St.
South Park Community Center	Multi-Purpose	S-O-M	164 South Park St.
St. Patrick's Church	Religious, Housing, Daycare, Food	S-O-M	756 Mission St.
S.F. Red Shield Community Center	Recreational	S.F.	95 McCoppin St.
S.F. Senior Activities Drop-In Center	Recreational, Food	S-O-M	360 -4th St.
Catholic Social Services	Counseling	S-O-M	Chinatown 785 Market St.
Adult Vocational Program	Transitional sheltered workshop for mentally retarded adults	S-O-M	657 Harrison St.
Asian American Mental Health Training Center	information not available		150 - 8th St.
Canon Kip Community House	Recreation and lunch programs for senior citizens, special transportation services, community outreach and organization, youth education programs	S-O-M	705 Natoma St.
Central City Head Start	information not available		360 - 5th St.

Organization	Type of Service	Area of Coverage	Location
Community Streetwork Center	Pre-delinquency prevention and job training	S-O-M	699 Mission St.
Legal Aid Society	Legal Counsel and Referral	S.F.	693 Mission St.
Department of Social Services	Food stamp distribution	S.F.	1360 Mission St.
South of Market Filipino-American Neighborhood Association	information not available		543-A Natoma St.
Filipino Education Center	Education (K-6), screening & school placement (K-12), job referral and community activities for immigrants.	S.F.	824 Harrison St.
Filipino Organizing Committee	information not available		51 Russ St.
Filipino Youth Coordinating Committee	Work experience program, tutoring, counselling, court liaison for youth aged 14-18	S.F.	944 Market St.
Economic Opportunity	Job counselling, housing, immigration, child care, food supplements for mothers of infants	S.F.	1173 Mission St.
Harriet Street Center	Alcoholism treatment, adult day recreation, counselling, court liaison	S-O-M	245 Harriet St.
John O'Connell Automotive School	Automotive job training	S.F.	765 Harrison St.
Neighborhood Legal Assistance	Civil legal assistance for low-income persons	S.F.	532 Natoma St.

Organization	Type of Service	Area of Coverage	Location
Northeast Community Mental Health	Mental health services	S-O-M	450 - 6th St.
Open Road	Career workshops and counselling for out-of-school youth ages 16-21	S.F.	149 - 9th St.
Phoenix Corporation	information not available		164 South Park St.
Rehab.	information not available		1198 Howard St.
St. Patricks Day Care	Full day program for children ages 3-6 with low-income working parents	S.F.	366 Clementina St.
St. Vincent de Paul Ozanam House	Alcoholic detoxification	S.F.	1175 Howard St.
Salvation Army Harbor Light Mission	Alcoholic detoxification and rehabilitation	S.F.	1275 Harrison St.
Salvation Army Senior Activity Center	Health screening, recreation, counselling, referral, classes for senior citizens	S-O-M	360 - 4th St.
S.F. Pretrial Diversion Project	Workshops, tutoring, basic education, job referral, etc. for adults referred from courts	S.F.	739 Bryant St.
Southeast Asian Refugee Resettlement	Vocational training, job referral, social services, youth programs for Vietnamese, Laotian, and Cambodian refugees	S.F.	944 Market St.
Tenants and Owners Development Corporation	Development of housing for the elderly	S-O-M	133 Jessie St.

Sources: San Francisco Department of Social Services, Resource Directory, June 1977; Salvation Army; San Francisco Housing Authority; San Francisco Catholic Social Services; and agencies listed.

APPENDIX L: GEOLOGY AND SEISMOLOGY

STRATIGRAPHY

Geologic materials in YBC are of two major types: bedrock and unconsolidated sediments. Franciscan Formation rocks which underlie most of San Francisco are present in the Project area. Franciscan rocks are a complex assemblage of predominantly sedimentary rocks with smaller amounts of volcanic and metamorphic rocks. The sedimentary rocks contain fossils which indicate a Cretaceous age (about 130 million years old) in this area. The rocks are characterized by lateral changes in lithology, and have been extensively folded, shattered, sheared and intruded by serpentine and volcanic greenstone. Franciscan rock, termed "melange," consists of rounded fragments of hardrock in a matrix of soft, plastic, waxy material. The melange was formed by shearing of Franciscan rocks (sliding of the rock layers under friction). Sheared Franciscan rock is generally unstable and forms a poor foundation base. Franciscan melange may form part of the bedrock below YBC. The weathering of Franciscan rocks in the Project area produces soils which range between sandy clay and clayey sand.

Most of YBC is located in an area of unconsolidated sediments. The thickness of these sediments is variable, in part because the bedrock surface upon which they were deposited is irregular. Outcrops of the bedrock are in fact the tops of hills which poke through the younger unconsolidated sands and mud. In general, the depth of the unconsolidated sediments (i.e., the depth of the bedrock surface) increases toward the north, away from the bedrock exposure on Rincon Hill. Borings at selected sites/1/ indicate this trend, e.g., at Third and Perry Streets, 50 feet of sediment cover; at Fourth and Jessie Streets, 172 feet of sediments; at Stevenson and Annie Streets, 197 feet of sediments; at Mission and Second Streets, 259 feet of sediments. Borings/2/ indicate that in CB-3 the top of the bedrock surface lies at elevation -120 feet (all elevations with respect to San Francisco datum unless otherwise noted) near Third and Folsom Streets and falls to -245 feet in CB-2./3/.

The unconsolidated sediments which rest upon the Franciscan bedrock are formed in a series of variable and irregularly placed beds. The oldest of the sediments is called the "older bay mud," and rests directly on the anciently eroded surface of the Franciscan bedrock. The mud varies in thickness, from thin deposits to as much as 200 feet in the central portion of San Francisco Bay. A thickness of roughly 100 feet to 150 feet of the mud is found in the YBC area/4/. The borings/2/ in CB-2 and CB-3 indicate that the top of the older bay mud lies between -65 feet in the central portion of CB-3 and -90 feet in the southeastern corner of the same block./5/. The older bay mud is mostly firm, silty clay with lenses of sand and pebbles.

The older bay mud is covered with a more recent deposit of sand, called the Colma formation. The Colma sand is interfingered with mud deposits, but is predominantly well-sorted sand. In this portion of San Francisco the sand has persistent, horizontal stratification, but in places it has interfingered, steeply inclined cross beds./4/. The Colma formation is mostly a water-and-gravity-laid deposit, but some may be wind-laid. The Colma sand is fine- to medium-grained with small to moderate amounts of silt and clay, and has a light brown to gray color. The deposit is roughly 20 to 50 feet thick in the YBC area. The top of this layer varies in elevation from -14 feet to -29 feet near Howard and Fourth Streets, but rises toward the east to -5 feet in the northeastern and southeastern corners of CB-2 and CB-3./6/.

The Colma sand is covered by "younger bay mud" and dune sand. The younger bay mud is interfingered with the dune sand. The younger bay mud is further subdivided into a lower semi-consolidated layer and an upper soft layer./7/. As a whole, the younger bay mud is a gray, plastic, silty clay with some lenses of sand, peat and shell fragments. In the YBC area it is probably less than 10 feet thick in most places. The Dames and Moore Company borings indicate that the surface of this mud layer lies above elevation 0 in the southeastern corner of CB-E and slopes westward to below -20 feet near the intersection of Howard and Fourth Streets./8/. The bay mud was the surficial deposit in the southwestern portion of the area (SB-1 and SB-2, and WB-3) during historical times when a tidal mud flat and marsh existed around Mission Bay. That tidal flat was later covered with artificial fill.

In most of YBC, the younger bay mud is sandwiched between dune sands. In these areas, a layer of dune sand rests directly on the Colma sand formation. The dune sand is, in turn, overlain by the younger bay mud and those mud deposits are covered by more dune sand. Dune sand covers most of YBC at the surface; just over one-half of the City of San Francisco is covered by a variable thickness of such sand. The dune sands are wind-carried deposits laid by the prevailing winds from the Pacific Ocean. The dune sand is clean, well-sorted, fine- to medium-textured material. Its color varies from brown to light grey. The dune sand ranges in thickness from under 50 feet to over 100 feet. The surficial sand dunes have been leveled and graded in the area.

The southwestern and eastern portions of YBC are covered with artificial fill. Areas along the San Francisco Bay waterfront were marshy or open tidal mud flats (comprised of younger bay mud) which were covered with assorted types of debris in the years following 1849. The artificial fill consists largely of dune sand and includes silt, clay, rock waste from excavations, man-made debris and organic waste. In the northeastern portion of YBC, in EB-2 and EB-3, the artificial fill is 30 feet deep. In the southwestern portion in SB-1, SB-2 and WB-3, the artificial fill is thinner, generally 10 to 20 feet in depth. The artificial fill was dumped on top of the younger bay mud. At the time of the 1906 earthquake, damage to structures built on this surface resulted from failure of these materials./9/.

No minerals of commercial value have been located in the YBC area./2/.

STRUCTURAL GEOLOGY AND SEISMICITY

The major faults which could affect the site are the San Andreas and the Hayward faults. Major earthquakes (that is earthquakes with a Richter magnitude of 6 or greater) affecting the San Francisco Bay region occurred on the San Andreas fault in 1838, 1865, and 1906, and on the Hayward fault in 1836 and 1868./10/. Many minor earthquakes and tremors have occurred on those faults in historic times./11/. The locations of earthquake epicenters (the geographic location on the earth's surface above the focus of an earthquake) suggest that other active faults occur in the San Francisco Bay, but data are too meager to identify them.

As a whole, the Franciscan bedrock is sheared and shattered. Two major shear zones occur in the bedrock of San Francisco, both trending roughly northwest to southeast. YBC is located just to the east of the easternmost shear zone, which extends between Fort Point and Potrero Point. This shear zone may dip eastward at a low angle and hence may lie below the surface at the YBC site. The forces which produced the the shear zone are no longer active, but the melange bedrock contains abundant platey minerals and is potentially unstable.

SEISMIC HAZARDS

An earthquake comparable to the 1906 San Francisco earthquake would be expected to produce ground shaking of varying intensity in the city. Five general levels of intensity have been described:/12/.

> "Very Violent." Cracking and shearing of rock masses. Deep and extended fissuring in soil, many large landslides and rockfalls.
>
> "Violent." Fairly general collapse of brick and frame structures when not unusually strong. Serious cracking of better buildings. Lateral displacement of streets, bending of rails and ground fissuring.
>
> "Very Strong." Masonry badly cracked with occasional collapse. Frame buildings lurched when on weak underpinning with occasional collapse.
>
> "Strong." General but not universal fall of brick chimneys. Cracks in masonry and brick work.
>
> "Weak." Occasional fall of brick chimneys and plaster.

The intensity of ground shaking would be dependent primarily upon the geographic position relative to the epicenter of the earthquake, and the geologic materials at the site. Strong, very strong and violent ground shaking would occur in YBC during such an earthquake.

Earthquakes may induce liquefaction of water-saturated loose silt, sand, and gravel. The liquefaction may occur in the surface material or in a layer at some depth below firmly compacted materials at the surface. In the latter case, the buried liquefied layer may reduce friction in the movement of one material past other material./13/. In both cases, liquefaction results in sudden ground failure, because of the loss of the shear strength of the material (the internal resistance offered to the stress that otherwise tends to cause two adjacent parts of a solid to slide past one another parallel to the plane of contact).

Granular material with a small clay content and a uniform grainsize distribution generally has the greatest potential for liquefaction. Such sediments are usually silts, sands or gravels and must lie within or beneath the groundwater table/14/. Artificial man-made fill which has been deposited on soft bay mud or unconsolidated sand possesses liquefaction hazard potential.

Two types of ground failure in the YBC area might result from liquefaction of artificial fill induced by an earthquake: lateral-spreading landsliding and bearing-capacity failure. Because of the gentle slopes of the site (about 0.8%), a third type of failure, flow landsliding, probably would not occur. During the 1906 earthquake, liquefaction produced lateral-spreading landslides with movement of the unconsolidated material toward Rincon Hill. Pulled-apart curbs, walks and rails occurred at the upper end and to a smaller extent along the margin of the slide. Buckled curbs, walks and rails formed where the landslide butted into Rincon Hill. Water lines were broken by the lateral displacement/15/.

Failure of bearing capacity of the ground material could occur in zones of liquefaction hazard potential. Loss of foundation support, subsidence of structures, and the buoyant rise of buried objects could occur where bearing capacity failed. This type of failure apparently did not occur in the South-of-Market area in 1906. A basement in an area northeast of YBC filled with sand during the 1906 earthquake, which suggests a quicksand condition/15/.

Slow subsidence of the ground surface has occurred in the South-of-Market area./9/. Buildings have sunk below street level, and/or are tilted because of differential settlement below the structure. Earthquakes can induce rapid, uneven subsidence. Some structures collapsed or were severely damaged by such subsidence during the 1906 earthquake with injury and loss of life. The hazard of such rapid subsidence induced by a maximum intensity earthquake is greatest in reclaimed land with artificial fill overlying compressible bay mud and loose sand. In YBC, the area of potential subsidence hazard is coincident with such geological conditions, and hence coincident geographically with the area of potential liquefaction hazard.

YBC is located in a relatively protected site with regard to a tsunami incursion. As a result, for the 100-year tsunami, the probable run-up on the shore near YBC would be 4.8 feet, for the 500-year case, 8.0 feet./16/. (Tsunami and seiche run-up elevations in this section are based on mean sea level datum - MSL.) Because all portions of YBC lie above 10 feet MSL, it is expected that the site is not subject to tsunami inundation hazard. The 1906 earthquake did not produce a seiche of any significance in San Francisco Bay. The maximum possible seiche in the Bay would cause an estimated run-up of about 10 feet on either the east or west shore./17/. Thus, YBC is not expected to have a seiche inundation hazard.

/1/ Schlocker, T., 1974, Geology of the San Francisco North Quadrangle California, Professional Paper 782, U. S. Geological Survey, Washington, D. C.

/2/ Dames and Moore, 1972, Foundation Investigations, Yerba Buena Center, Exhibit Hall and Sports Arena, prepared for the City and County of San Francisco.

/3/ U.R.S. and Arthur D. Little Company, 1973, Draft Environmental Impact Report, Yerba Buena Center Public Facilities and Private Development, prepared for the City and County of San Francisco, p. V-L-25.

/4/ Schlocker, T., op. cit., p. 71.

/5/ URS and Arthur D. Little Company, op. cit., p. V-L-24.

/6/ URS and Arthur D. Little Company, op. cit., p. V-L-23.

/7/ URS and Arthur D. Little Company, op. cit., p. V-L-5.

/8/ URS and Arthur D. Little Company, op. cit., p. V-L-22.

/9/ Steinbrugge, K., 1969, "Seismic Risk to Buildings and Structures on Filled Lands in San Francisco Bay," in H. P. Goldman, ed., Geologic and Engineering Aspects of San Francisco Bay Fill, Special Report 97, California Division of Mines and Geology, Sacramento.

/10/ NOAA (National Oceanic and Atmospheric Administration, 1972, A Study of Earthquake Losses in the San Francisco Bay Area, Data and Analysis, prepared for the Office of Emergency Preparedness.

/11/ San Mateo County Planning Department, 1976, Seismic and Safety Elements of the General Plan.

/12/ URS and John A. Blume Associates, 1974, San Francisco Seismic Safety Investigation, prepared for the City of San Francisco.

/13/ Nichols, D.R., and J. M. Buchanan-Banks, 1974, Seismic Hazards and Land-Use Planning, Circular 690, U. S. Geological Survey, Washington, D. C., p. 18.

/14/ URS and John A. Blume Associates, op. cit., p. 23.

/15/ Youd, T. L., and S. N. Hoose, 1976, "Liquefaction during 1906 San Francisco Earthquake," Journal of the Geotechnical Engineering Division ASCE, Vol. 102, No. GT5, Proceedings Paper 12143, May 1976, p. 425-439.

/16/ Garcia, A. W., and J. R. Houston, 1975, <u>Type 16 Flood Insurance Study, Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound,</u> Technical Report H-75-17, Hydraulics Laboratory, U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

/17/ URS and John A. Blume Associates, <u>op. cit.,</u> p. 31.

APPENDIX M: TRANSPORTATION METHODOLOGY AND SOME RESULTS

Basic Assumptions and Emphasis

- The street system would remain as it currently exists in terms of street alignment and configuration. That is to say, the present system of one-way and two-way streets and the related kinds of parking restrictions, traffic control devices, etc. are assumed to be in existence for the future time period of analysis, 1988. It is recognized that on-street parking in YBC would probably be reduced as development occurred./1/

- The capacity of the street system to handle vehicular traffic has been based upon the guidelines of the "Highway Capacity Manual"./2/ Further, the capacity of the sidewalk system to handle pedestrian traffic has been based upon existing effective widths and the guidelines in "Pedestrian Planning and Design"./3/

- Transit capacities have been based upon the existing configuration of equipment and schedules and the number of persons per vehicle seated and standing (where allowed by agency policy).

- Unavailability of information precluded estimating the future effects of changes in the transit agency capacities and operations. The analysis has assumed the current conditions as base conditions for 1988. The advent of Muni Metro would approximately double the capacity of the existing street car lines./4/ This change has been taken into account in the capacity analysis for the Market Street corridor, but not in the corresponding patronage analysis; the Municipal Railway has made no projections of patronage changes resulting from capacity increases.

- Travel projections have been made for 1988 conditions in YBC. Full YBC buildout would be complete in 1988.

- A limited amount of public and private parking would be made available in YBC; any additional future long-term parking would be south of the project area in the vicinity of Harrison and Bryant Streets.

- Considerable emphasis has been placed on walking to and from the various uses in YBC. An average of at least 800 feet of walking distance has been assumed for access from transit to YBC land uses, with longer distances for travel from the Southern Pacific Railroad, A-C Transit, BART, and Golden Gate Transit service at First Street.

- Market and Mission Streets would continue to play major roles as transit-preferential streets serving the YBC area.

- The growth of existing travel to 1988 varies with the mode of transportation. Automobile travel in the area has been assumed to increase at a rate of 1.8% per year./5/

- Transit in the area would continue to carry the existing level of ridership through 1988; YBC demands would be added to this.

Additional assumptions are stated below where applicable.

Analysis Methodology

For estimation of the amount of new travel (generated by YBC beyond current levels), trip generation rates were estimated for the various land use categories. A review of the literature/6/ established the trip generation factors shown in Table M-1. These were applied to the corresponding YBC land use designations to produce estimates of weekday and Saturday person trip-ends. (Trip-ends refer to two-way person travel. For example, each person patronizing a restaurant generates two trip-ends at the restaurant--one arrival and one departure.) Person trip-ends in Table M-1 include walking, transit and auto trip-ends. The resulting travel estimates are conservatively high because some of the trips generated (independently) for the retail uses would actually come from the trips generated for one or more of the other uses. Travel characteristics of the convention center and of the recreation/entertainment park were based on information provided by the architects responsible for the concept/design of each./7/

Three time periods for traffic setting and impacts were analyzed:

- The hour from 4:30 to 5:30 p.m. on a weekday (mid-week).
- The hour from 7:00 to 8:00 p.m. on a Friday.
- The hour from 3:00 to 4:00 p.m. on a Saturday.

These time periods were selected to create situations in which the combination of the existing street traffic levels with the new traffic from YBC would produce the heaviest loading. (Other periods (24-hour weekday, 6-9 a.m. 10 a.m.-6 p.m., 10 p.m.-7 a.m.) were analyzed to provide inputs for air quality and noise analysis.)

For each of the land uses, a percent of the total generation was assigned to each of the three time periods. The peak period percentages were developed from the trip generation literature./6/ (See also footnote 7). The p.m. peak hour percentages were reduced by 20% from what the literature indicated to adjust for the location of YBC in the metropolitan area. The reductions were necessary because the literature-based rates had been developed from studies done at non-central-city locations, which produce higher peaking rates (percentages of daily trips) than do major urban areas, such as YBC.

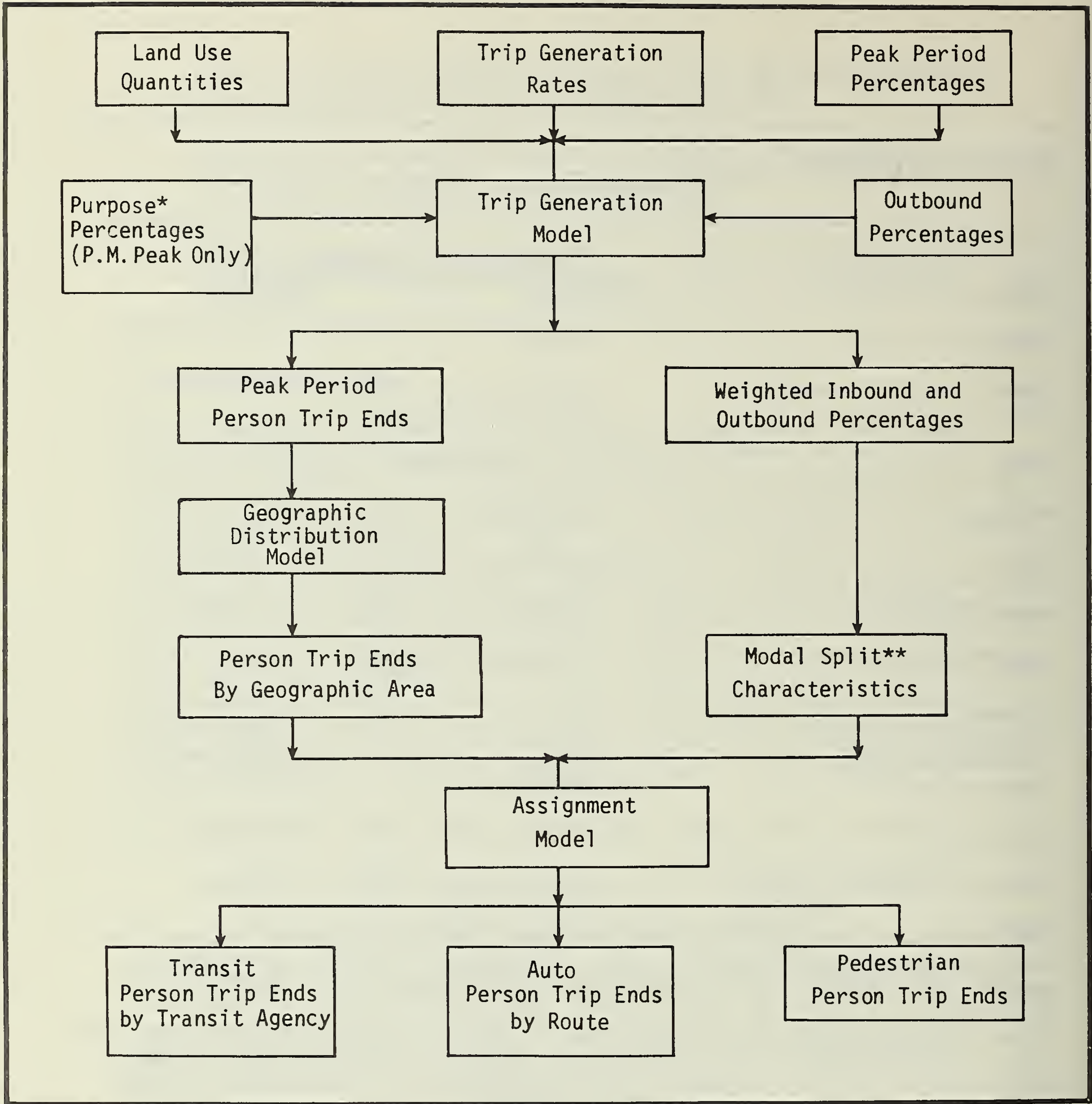
APPENDIX M, TABLE M-1

TRIP GENERATION RATES FOR YBC*

LAND USE CATEGORY	PERSON TRIP-ENDS/DAY Weekday	Saturday
Convention Center	62,500**	0***
Commercial Entertainment	50/1000 sq. ft. GFS (Gross floor space)	75/1,000
Hotel	10.5/occupied room+	10.5
Retail	30/1,000 sq. ft. GFS	35/1,000
Office	12/1,000 sq. ft. GFS	1/1,000
Community Service	25/1,000 sq. ft. GFS	5/1,000
Light Industrial	8/1,000 sq. ft. GFS	1/1,000
Housing:		
Subsidized Elderly	3/D.U.	3/D.U.
Subsidized Family	6/D.U.	5/D.U.
Market Rate	7/D.U.	6/D.U.
General Park	1.5/1,000 sq. ft. GFS	1.5/1,000
Downtown Support Service	6/1,000 sq. ft. GSF	1/1,000

*The recreation/entertainment park patronage characteristics are unique; they have been handled separately by direct estimation of traffic for the normal weekday peak hour and the (Friday) night and Saturday peaks. See Table F-5.
**The convention center has been assumed at the peak occupancy level of 24,000 persons for the weekday peak hour traffic analysis. It is recognized that this condition would occur only a few times per year if the estimated annual attendance of up to 500,000 persons holds true.
***Conventions normally run from Sunday through Thursday.
+80% occupancy assumed.

SOURCES: See footnote 6.



* Work, non-work, service

** Split between transit and auto, for example

FLOWCHART OF YBC TRAVEL DEMAND ANALYSIS FOR PEAK PERIOD

To facilitate assignment of traffic to each street, outbound (away from YBC) percentages were developed for each of the land uses. These percentages were developed from the trip generation literature./6/ (See also footnote 7).

Figure M-1 flow-charts the trip generation and assignment process. For each of the land use categories (exceptions: convention center and recreation/entertainment park), the quantity of units (GFS--gross floor space; DU--dwelling unit) was multiplied by the trip-generation rate, producing 24-hour person trip-ends (PTE). Peak hour PTE were calculated by multiplying by the peak hour percentages. Outbound peak hour PTE were calculated by multiplying by the outbound percentage. Convention center and recreation/entertainment park trips were supplied in a form that allowed them to be added directly to the peak hour trips from other generators, as well as to 24-hour totals. The PTE generated were summed over all the land use categories for the 24-hour, peak hour, and outbound peak hour PTE. For the purpose of assignment, the weighted percentages of inbound and outbound trips were calculated by dividing the total outbound peak hour PTE by the total peak hour PTE. Table M-2 and M-3 display the results of this process. Data are presented as they came out of the computer, except for the totals, which are rounded off.

Sufficiently detailed origin-designation and modal split data not being available, the traffic distribution and assignment model was developed as an aggregate rather than as a disaggregate model. An aggregate model is one in which large groups of people with similar characteristics are considered, whereas a disaggregate model considers groups of a much smaller size (one household, one person, for example). To develop and calibrate a disaggregate model requires voluminous origin/destination data usually collected at the home interview level. Therefore, an aggregate model was developed in which all of the trips generated by YBC were considered to be one group. For this single group, origin-destination data and modal split data were available. To calibrate the model to reflect the Bay Area travel patterns, three trip purposes were used for the p.m. peak and one trip purpose for the night and weekend. For the p.m. peak, the trips would split 75% work (regular jobs in YBC), 20% non-work and 5% service. Service trips were considered to be all auto-oriented, whereas work trips were heavily transit oriented. For each of the trip purposes, a geographic distribution percent was developed as shown in Table M-4.

A modal split for each of the geographic areas was developed (Table M-5). The percentages were based upon estimates of existing and/or future population distribution, available modes and patronage characteristics of these modes. A switch from auto to transit by some commuters by 1988 was assumed for those geographic origins whoses routes contain bottlenecks (bridges, freeways) that are at, or reaching, capacity. San Francisco drivers are not so limited in their choice of routes; therefore no change in the auto/transit split for San Francisco origins was assumed.

APPENDIX M, TABLE M-2

1988 WEEKDAY TRIP GENERATION

Land Use	Sq. Ft.	Person TE/Day Per Sq. Ft.	24-Hour Person TE	% of 24-Hr	P.M. Peak Hour Person TE	P.M. Peak Hour Outbound Percent	P.M. Peak Hour Outbound Person TE	% of 24-Hr.	Night Hour Person TE	Night Hour Outbound Percent	Night Hour Outbound Person TE
Conv. Cen.	--	--	62,500.	--	12,000.	100.	12,000.	--	6,000.	0.	0.
Coml. Ent.	400,000.	0.050	20,000.	8.0	1,600	20.	320.	20.0	4,000.	20.	800.
Hotel	700. (RMS.)	8.400 (Per RM.)	5,880.	12.0	706.	20.	141.	5.0	294.	60.	176.
Retail	639,096.	.030	19,173.	6.5	1,246.	60.	748.	5.0	959.	40.	383.
Office	6,464,250.	.012	77,571.	14.5	11,248.	80.	8,998.	1.0	776.	50.	388.
Compty. Serv.	86,000.	.025	2,150.	4.0	86.	60.	52.	4.0	86.	20.	17.
Light-Indst.	1,077,450.	.008	8,620	12.0	1,034.	90.	931.	1.0	86.	50.	43.
Subs. Eld. Hsg.	612. (DU)	3.000 (Per DU)	1,836.	4.0	73.	20.	15.	1.0	18.	50.	9.
Mkt. Rt. Hsg.	50. (DU)	7.000 (Per DU)	350.	10.5	37.	20.	7.	2.0	7.	50.	4.
TOTAL			198,000.		28,000.		23,200.		12,200.		1,820.

P.M. Peak Hour: Weighted Outbound Percent = 79.6; Weightee Inbound Percent = 20.4

Night Hour: Weighted Outbound Percent = 14.9; Weighted Inbound Percent = 85.1

P.M. Peak Hour 4:30 - 5:30 P.M.

APPENDIX M, TABLE M-3

1988 SATURDAY TRIP GENERATION

Land Use	Sq. Ft.	Person TE/Day Per Sq. Ft.	24-Hour Person TE	% of 24-Hr.	Saturday Hour (3:00 - 4:00 P.M.) Person TE	Outbound Percent	Outbound Person TE
Coml. Ent.	400,000.	.075	30,000.	13.0	3,900.	50.	1,950
Hotel	700. (RMS.)	8.400 (Per RM.)	5,880.	10.0	588.	40.	235.
Retail	639,086.	.035	22,368.	16.0	3,579.	50.	1,789.
Office	6,464,250.	.001	6,464.	10.0	646.	80.	517.
Comty. Serv.	86,000.	.005	430.	10.0	43.	60.	26.
Lt. Indust.	1,077,450.	.001	1,077.	10.0	108.	90.	97.
Subs. Eld. Hsg.	612. (DU)	3.000 (Per DU)	1,836.	5.0	92.	50.	46.
Mkt. Rt. Hsg.	50. (DU)	6.000 (Per DU)	300.	9.0	27.	50.	14.
TOTAL			68,400.		8,980.		4,670.

Weighted Outbound Percent = 52.0
Weighted Inbound Percent = 48.0

APPENDIX M, TABLE M-4

TRIP DISTRIBUTION FOR YBC (Percent of total person movements)

GEOGRAPHIC AREA	PURPOSE			
	WORK 1988	NON-WORK*	SERVICE*	NIGHT
North Bay (Marin and Sonoma Counties	6.4	2		2
Peninsula (San Mateo, San Jose & South)	19.6	12		13
East Bay (Bay Bridge)	14.0	11		11
Downtown/Northeast San Francisco (East of Van Ness, North of Market to the Embarcadero & South of Market to 101)	15.6	23**	50	38**
Northwest San Francisco (Richmond, Marina and Western Addition)	16.8	21		15
Southwest San Francisco (Sunset, Parkside, Mission, Ingleside, Excelsior, Twin Peaks, and Upper Market)	21.6	15	50	10
Southeast San Francisco (Hunters Point, East and South of 101)	6.0	16	___	11
TOTAL	100	100	100	100

* Distributions for these purposes are applicable for both 1980 and 1988.
** For some special uses, such as the recreation/entertainment park, attracting pedestrians from other nearby uses, the downtown additions would be higher. That use is about 15% of the YBC total development area.

SOURCES: "Transportation Conditions and Trends", San Francisco City Planning Department, 1976.

Transbay Terminal "Alternate Analysis and Patronage Update" DMJM, 1976

"Bay Area Transportation Study" 1980 Projections (BATS), 1965

"Series 2 Projections" Appendix A, ABAG, 1973.

Assignment of the trips to available modes and routes was done on the basis of the geographic distribution percentages and the outbound and inbound percentages. All of the non-pedestrian travel, as identified by origin/destination and mode, was assigned to corresponding transit lines and auto routes. The assignment of autos to routes was on the assumption that most auto parking would occur outside of YBC.

The analyzed principal modes of travel were walking, transit, and automobile. Secondary mode considerations involved taxis, jitneys, charter buses, and travel of commercial vehicles for service and delivery of goods.

Pedestrian travel was assumed to be principally by residents and workers within the area to functions within the area, plus that travel from within the area to automobile parking and to transit lines in and around the area. Calculation of pedestrian travel in the YBC area involved assignment of the pedestrians to external attractors (transit terminals, parking areas, hotel areas) as indicated by the distribution/modal-split/assignment model. Once the trips were assigned externally, they were traced into the YBC area and overlaid to produce a composite flow pattern for pedestrian travel. Assignment to internal YBC routes considered the location of each land use with respect to pedestrian generation.

The amount of travel related to service and delivery by commercial vehicles in the area was treated separately and was not a part of the basic modal-split analysis.

Parking that would be provided within YBC was assumed to include that public and private parking as proposed, and as required and/or permitted by the uses shown in the Tables IV-1 on page IV-11 (text) and C-1 (Appendix C). Required and/or permitted parking was based on the planning code and master plan policies. C-3-O, C-3-R, and C-3-S zones require parking to be provided only for housing. Conditional use provisions allow parking for the other uses. For example, M-1 zones require parking for office, retail, service and light industrial uses. No housing is allowed for M-1 zones with the exception of the YBC (redevelopment) area. Hence there are no statutory parking requirements for housing in the M-1 zones in YBC.

From the above requirements and conditional uses, parking supply was calculated on the basis of the following rates.

In the C-3-O, C-3-R, C-3-S zones:

- 1 parking space for each market-rate and subsidized family dwelling unit that has two or more bedrooms.

- 2 parking spaces for every 3 market-rate and subsidized family dwelling units that have 1 bedroom.

APPENDIX M, TABLE M-5

MODAL SPLIT (%) FOR YBC (PERSON TRIPS) 1988

GEOGRAPHIC AREA	MODE	PURPOSE			
		WORK	NON-WORK	SERVICE	NIGHT
North Bay	Auto	62	73	--	95
	Bus*	33	19	--	5
	Ferry*	5	8	--	--
Peninsula	Auto	66	80	--	95
	SPRR*	13	17	--	--
	SAMTRANS	21	3	--	5
East Bay	Auto	40	85	--	90
	Bus*	31	4	--	--
	BART	29	11	--	10
Downtown/Northeast San Francisco (Table F-14)	Auto	34	40	100	80
	Muni	66	50	--	15
	Walk**	--	10	--	3
	Taxi	--	--	--	2
Northwest San Francisco (Table F-14)	Auto	37	55	--	85
	Muni	63	45	--	15
Southwest San Francisco (Table F-14)	Auto	37	55	100	80
	Muni	50	36	--	10
	BART	13	9	--	10
Southeast San Francisco (Table F-14)	Auto	47	60	--	85
	Muni	53	40	--	15

*Access to these modes is a combination of Muni, walking, jitney, and taxi.
**Walking to the convention center and to the recreation/entertainment park was treated separately, as were taxi trips to these uses.

SOURCES: "Transportation Conditions and Trends", San Francisco City Planning Department, 1976
Transbay Terminal "Alternate Analysis and Patronage Update", DMJM, 1976
"Bay Area Transportation Study" 1980 projections (BATS), 1965; see note on Table F-14 source reference.

- 2 parking spaces for every 5 market-rate and subsidized family dwelling units that have no bedrooms.

- One-half the above spaces for subsidized elderly housing.

- 15 spaces or 7% of the proposed gross floor space (whichever is larger) for parking, for use other than the convention center, hotel and housing. 1 space for each 350 sq. ft. was used. (No spaces were provided for the convention center or the hotel).

In the M-1 zone:

- 1 space for every 500 sq.ft. of gross floor space (GFS) for offices with greater than 5,000 sq.ft. of GFS.

- 1 space for every 500 sq.ft. of GFS for retail uses with greater than 5,000 sq.ft. of GFS but less than 20,000 sq.ft.

- 1 space for every 250 sq.ft. of GFS for retail uses with GFS in excess of 20,000 sq.ft.

- 1 space for every 1,000 sq.ft. of GFS for service uses.

- 1 space for every 1,500 sq.ft. of GFS for light industrial uses.

- The housing rates for the C-3-O, C-3-R and C-3-S zones were assumed to apply, with the exception of the subsidized elderly housing, for which no parking was assumed in the M-1 zone.

The parking demand was calculated starting with the 24-hour person trip-ends in autos. The 24-hour person trip-ends were adjusted by factors for vehicle occupancy (persons per vehicle), daytime proportion of total daily trips, and parking space turnover (average number of times per day each daytime space is used) as shown in the following equation:

Parking Demand = ((persons trip-ends ÷ vehicle occupancy) ÷ 2 trip-ends x (daytime per trip proportion ÷ turnover))

The values for the above factors (Source: see footnote 5) are:

- Vehicle occupancy = 1.4 persons per vehicle

- Daytime proportion for work trips = 0.75
  non-work trips = 0.50
  service trips = 0.40

- Turnover rates for work trips = 1.5
  non-work trips = 5.0
  service trips = 2.0

Nighttime demand would be less than daytime demand.

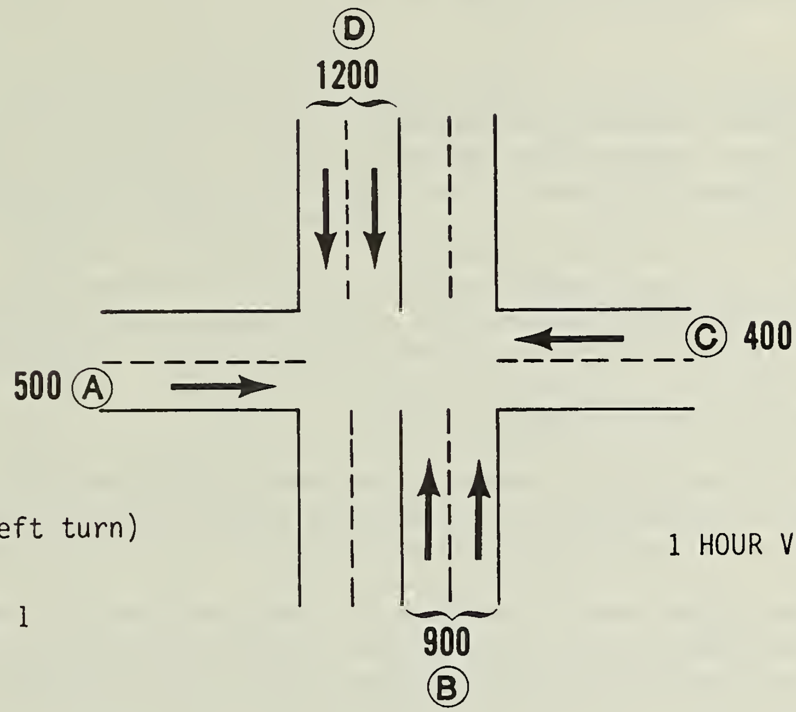
The transit analysis was done at principal surrounding cordon (check) points (representative points, encircling YBC, at which inbound or outbound trips were summarized in existing transit partonage studies) for Muni, SamTrans, and Golden Gate Transit, and at the specific points of loading for the other transit modes: BART, A-C Transit, and Southern Pacific Railroad. The analysis procedure determined the capacity of the transit lines at these cordon points. The total loadings on the systems for future years were estimated by summation of the existing loading and the estimated YBC additional patronage. The transit mode demand splits for Golden Gate Transit, Southern Pacific Railroad, SamTrans, A-C Transit and BART were assumed to increase between now and 1988. The rationale for these increases is based on the fact that each of these agencies serves an area external to San Francisco. For each of these areas, access to San Francisco is via well-defined auto corridors (Golden Gate and Bay Bridges, Bayshore Freeway, etc.) which are currently operating near capacity/8/ in the peak periods. The future modal split takes account of the likelihood that as the auto routes become more congested (for longer periods of time) some shift to transit will occur. This has not been assumed for the areas (transit agencies) internal to San Francisco, as a multiplicity of parallel routes exist for auto travel. With many parallel routes, the congestion would cause the autos to spread over distance to other routes rather than spread over time; thus, no shift to transit would be forced by traffic growth.

The transit analysis was for the peak two-hour period from 4:00 to 6:00 p.m. because patronage analysis studies have been done in these terms for the transit agencies. As the trip generation produced one-hour travel (4:30 to 5:30 p.m.) rather than two-hour travel (4:00 to 6:00 p.m.), an expansion factor of 1.67 was used to increase the one-hour transit travel to the two-hour level. This expansion factor was developed from analysis of the peaking characteristics of existing transit ridership on all of the transit modes. Note that for shorter time periods within the peak period (i.e., peak one-half hour or peak five minutes) the seated capacities are exceeded by 50 to 100% on some transit lines, for example BART Transbay, as indicated by an April 1977 study./9/ A similar analysis was done for the night hour from 7:00 to 8:00 p.m. (use of the expansion factor was not necessary for this analysis).

Demand/capacity ratios, expressed in percent of existing capacity, were calculated for p.m. peak and nightime periods for the existing and 1988 conditions.

For the mixed-vehicle (non transit: includes cars and trucks) analysis, ten intersections through which most of the traffic passes were used for the impact assessment. At each of the ten intersections, average vehicle headways (the average time intervals between vehicles entering an intersection) for the existing 1988 p.m. peak and nighttime conditions were calculated with the "critical lane" method of analysis. The "critical lane" method of intersection analysis is a technique for

FIGURE M-2: EXAMPLE CALCULATION OF "CRITICAL LANE" METHOD



1 HOUR VEHICLE VOLUMES

LEGEND

SIGNAL TIMING
(2 phases, no left turn)

PHASE 1

PHASE 2

Maximum Lane Volumes

Approach	A	500	vehicles	÷ 1 lane	=	500 veh/ln
	B	900	"	÷ 2 lanes	=	450
	C	400	"	÷ 1 lane	=	400
	D	1200	"	÷ 2 lanes	=	600

For 2 phases, only 2 approaches can conflict: for Phase 1 the maximum (critical) lane volume is on Approach D, and for Phase 2 the maximum (critical) lane volume is on Approach A.

Critical Lane vehicular volume through intersection =
600 veh/ln + 500 = 1100 veh.

Average Vehicular Headway =
(1 Hour ÷ 1100 vehicles) x 3600 seconds per hour = 3.3 seconds/vehicle.

If the analysis (vehicle volume) is for the peak 15 minutes, the factor changes from 3600 to 900.

calculating the level of service (a measure of congestion) for an intersection as a whole rather than calculating the level of service on each approach separately (Highway Capacity Manual method)./2/ The results from the "critical lane" calculations are in terms of either vehicular flow (vehicles per hour) or its inverse or reciprocal, vehicular headway (seconds per vehicle).

Analsyis of an intersection by the "critical lane" method consists of calculating the maximum vehicular volume in each land on each approach to an intersection for a predetermined time period (15 minutes, 1 hour, etc.,) for each phase of the signal timing. (A phase is a specific setting of the entire signal array--green, red green arrow--for a specific time interval). The conflicting approaches and phases are determined from the signal timing and intersection geometry. The maximum lane volumes for the conflicting approaches are summed, giving the average vehicular flow through the intersection. The average vehicular headway is calculated by inverting the flow (taking its reciprocal) and multiplying by the appropriate conversion factors. A simplified example of this method is shown in Figure M-2.

For estimation of future traffic, the base traffic (existing) was increased by a downtonw growth factor of 1.8% per year (see footnote 5 for source) to give the future level in 1988, and the new traffic generated by the YBC development was added. The p.m. peak hour analysis required the use of peak 15-minute factors from existing traffic data. These factors were than applied to the total calculated hourly traffic to give the 15-minute approach volumes at the intersections. The guideline headways are minimum (design) values/10/; they vary because of the difference in pedestrian volumes at each intersection. (The higher the pedestrian flow at an intersection, the higher the vehicle guideline headway; that is, fewer vehicles can pass through an intersection that has high pedestrian volumes). Actual headways larger than the guideline values indicate better conditions than Level of Service "D".

Assignment of generated traffic to YBC streets depend on location of parking. The assumption was made that the principal amount of available long-term parking would be outside YBC, adjacent to the southerly YBC boundary in the vicinity of Harrison Street and of Bryant Street.

For the evening peak hour, less than about 10% of Third Street traffic was assigned to Market and Mission Streets, recognizing the fact that these are preferential streets for transit flow, and thus less attractive to regular auto commuters. Regular commuters to the north would tend to use routes such as the Bush/Pine pair. Since most of the park is southerly of YBC, the Howard/Folsom and Harrison/Bryand pairs would be more attractive than Market and Mission Streets.

Sensitivity

The traffic impact analysis was based upon the various estimates for land use allocation and amount of gross floor area or number of dwelling units associated with the total development. The travel estimates are sensitive to changes in the projected developmental figures. The impact analysis is sensitive also to parking price structures and fuel availability and cost, all of which affect the auto mode split.

The impact analysis for both transit and mixed vehicles is sensitive to future traffic management changes in the South-of-Market area. These changes could take the form of increased development of transit preferential streets and further restrictions of on-street parking in order to facilitate general vehicle flow.

The transit impact analysis is sensitive to future changes in the agencies' operating characteristics. Increases in capacity (service), such as for the Muni Metro, could reduce dependence on the auto.

The impact analysis is sensitive also to the general increase in intensity of land use south of Market Street, with a resulting increase in pedestrian volumes. As previously noted, pedestrian volumes affect the intersection capacity. Of more importance is the impact of congestion on the movements and safety of pedestrians themselves.

In the judgment of the TJKM traffic engineers (in the light of the above uncertainties, the quality of the available data, and the type of trip-generation model used), the overall accuracy of the travel demand projections is in the range of ± 10-15%.

FOOTNOTES

/1/ S. Shoaf, San Francisco Department of Public Works, Bureau of Traffic Engineering, telephone communication, November 9, 1977.

/2/ Highway Research Board, 1965, Highway Capacity Manual 1965, Special Report 87, National Academy of Sciences, National Research Council Publication 1328.

/3/ Fruin, John J. 1971, Pedestrian Planning and Design, Metropolitan Association of Urban and Environmental Planners, New York.

/4/ G. Cauthen, Senior Civil Engineer, San Francisco Muni, telephone communication, August 18, 1977.

/5/ This rate is the one used in the 1970 San Francisco Downtown Parking and Traffic Survey (DPATS), San Francisco Department of Public Works. As the peak hour traffic volumes reach capacity, any growth in vehicle flow beyond that point would not be possible. Either the peak hour would broaden to include other adjacent hours or there would need to be a shift to other modes of travel than the automobile.

/6/ The literature reviewed included: California Department of Transportation (CALTRANS), District 04, 1966-1976, Trip End Generation Research Counts Progress Reports, Repts. 1-11; Institute of Transportation Engineers (ITE), 1976, Trip Generation, ITE Informational Report; National Cooperative Highway Research Program (NCHRP), 1969, Urban Travel Patterns for Hospitals, Universities, Office Buildings, and Capitols, Rept. No. 62; NCHRP, 1971, Projection of Highway Utility, Trip Generation Vocabulary, Rept. No. 121; TJKM, 1974, City of Sausalito Comprehensive Traffic Study.

/7/ Convention center: J. E. MacArthur of Hellmuth, Obata and Kassabaum, Inc. (HOK); recreation/entertainment park: R. Gryziec, Architect/Planner.

/8/ A recent study (Trends in Traffic Patterns at the Bay Bridge and Caldecott Tunnel, University of California (Berkeley) Institute of Transportation Studies, 1977) indicates that the Bay Bridge is operating at capacity for short periods of time during each peak period. Similar situations are occurring on the major auto corridors.

/9/ Univeristy of California (Berkeley) Institute of Transportation Studies, 1977, Traffic Survey Series A 48.

/10/ The guideline headway represents "critical lane" volume or the intersection "capacity" at Level of Service "D". (Under Level "D" (Highway Capacity Manual, op. cit.) "delay is substantial during short peaks within the peak period, but there is enough time with lower demand to permit periodic clearance of queues.") A demand/capacity ratio could be used as an equivalent to headway. This may be easier to understand.

Example: A 2.6 second headway with moderate pedestrian traffic is the same as a demand of 1,400 vph. "Capacity" at Level of Service "D" is 1,200 vph, which is the same as a headway of 3.0 seconds. The demand capacity ratio would be: 1,400/1,200 = 1.17. This is equivalent to comparing a 2.6 second actual headway with a guideline headway of 3.0 seconds.

APPENDIX N: <u>NATIONAL REGISTER OF HISTORIC PLACES</u>

The National Register of Historic Places, some times simplified to National Register, is the official list of the Nation's cultural resources worthy of preservation. The National Register is maintained by the U. S. Department of Interior and is published annually each February with monthly supplements in the Federal Register. The following criteria are designed to guide nominations to the National Register, in consultation with State Historic Preservation Officers:

> The quality of <u>significance</u> in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A. that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. that are associated with the lives of persons significant in our past; or
>
> C. that embody the distinctive characterists of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. that have yielded, or may be likely to yield, information important in prehistory or history.
>
> Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following catetories:

A. a religious property deriving primary significance from architectural or artistic distinction or historical importance; or

B. a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

C. a birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his productive life; or

D. a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or

E. a reconstruced building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

F. a property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance; or

G. a property achieving significance within the past 50 years if it is of exceptional importance.